Laboratory

THE

AMERICAN JOURNAL OF PHARMACY.

JANUARY, 1867.

ON LIQUOR MAGNESIÆ CITRATIS.

By John M. Maisch.

During the discussion on the Internal Revenue Law which took place at the last meeting of the American Pharmaceutical Association, at Detroit, Mich., Prof. Edward Parrish remarked that the solution of citrate of magnesia prepared by the formula of the Pharmacopœia would not keep, but soon produced a crystalline precipitate of neutral citrate of magnesia. Since my name was then mentioned in this connection, it may not be considered out of place to offer some remarks on this subject.

When returning to the practice of pharmacy last spring, my attempts to prepare this solution by the officinal formula utterly failed to produce a stable solution; and it was only by reducing the amount of magnesia from 120 gradually to 100 grains, that I succeeded. These experiments were made with commercial light magnesia, of good quality, containing only a very small amount of carbonic acid, but free from iron and lime. When 105 grains of this magnesia was employed to 450 grains of crystallized citric acid and 40 grains of bicarbonate of potassa, the solution would keep for a few days, but then crystals of the neutral citrate would be gradually deposited. These results are in direct opposition to the statement of the U. S. Dispensatory, which asserts (12th edition, page 1207) that "solution of citrate of magnesia made by this formula (with 120 grains calcined magnesia) is not liable to the objection of letting fall a granular precipitate." On inquiry among some of my friends

of the pharmaceutical profession, I learned that they met with the same difficulty, and overcame it only by adopting a formula differing from that of the Pharmacopœia in the proportion of the materials employed, some departing in this instance from *all* the quantities directed by our national standard. I have heard that some apothecaries employ only 240 to 300 grains of citric acid to the bottle, and reduce the amount of magnesia or carbonate of magnesia accordingly. Prof. Parrish, in the third edition of his Treatise on Pharmacy, gives 360 grains citric acid to 105 grains of magnesia, which, calculated for the officinal quantity of 450 grains of citric acid, would require 131 grains, or 11 grains more of magnesia than the Pharmacopœia orders. This proportion may suit very well to a calcined magnesia which by exposure to the air has become considerably hydrated and carbonated, but it exceeds the amount of a fair quality of calcined magnesia by about 30 per cent., and of pure magnesia, free from carbonic acid and water of hydration, by nearly 50 per cent., as I shall presently show.

What the Pharmacopœia means by the term "magnesia" is pretty clear, from the officinal process for preparing it. It directs to expose carbonate of magnesia to a red heat for two hours, or until the carbonic acid is entirely expelled. Carbonate of magnesia is a hydrated basic carbonate; on exposing it to heat, the water of hydration is given off first, and afterwards the carbonic acid, so that if all the carbonic acid has been expelled, the earth consists only of MgO.

Among the tests for magnesia, the Pharmacopœia requires non-effervescence with acids; consequently the preparations wherein magnesia is used are, or ought to be, based upon perfectly calcined magnesia, of the formula MgO.

For the solution under consideration, our national authority orders 450 grains crystallized citric acid to 120 grains magnesia. Citric acid has the formula $3HO,C_{12}H_5O_{11}$+aq. weight of equivalent 201, or it contains 2 aq., and has then an equivalent weight of 210. 40 grains bicarbonate of potassa (equivalent weight 100·2, or 3 equivalents = 300·6) require for complete neutralization 26·75 grains monohydrated citric acid; for

300·6 : 201 : : 40 : 26·75.

This amount deducted from the citric acid employed leaves 450 —26·75=423·25 grains to combine with magnesia. The equivalent weight of magnesia is 20, or 3 equivalents = 60. The remaining citric acid requires, therefore, for complete neutralization, 201 : 60 : : 423·25 : 126·34 grains of pure magnesia, or only $6\frac{1}{3}$ grains more than ordered by the Pharmacopœia.

Commercial citric acid, however, mostly contains, and probably often consists altogether of the bihydrate; the amount required for neutralizing the bicarbonate of potassa will then be 300·6 : 210 : : 40 : 27·94 grains, leaving 450—27·94=422·06 grains citric acid to combine with magnesia, of which will be required for complete neutralization 120·65 grains; for

210 : 60 : : 422·06 : 120·65.

This amount is that of the Pharmacopœia, within $\frac{2}{3}$ gr. It is obvious, therefore, that if pure magnesia is used, its quantity is sufficient to form with almost the entire amount of citric acid, the neutral citrate of magnesia $3MgO,C_{12}H_5O_{11}+14$ aq., which has been shown by Richter, Delabarre and Prof. Procter to be separated from its aqueous solution on standing, and then to be as good as insoluble in water.

Exposed to the atmosphere, calcined magnesia gradually absorbs and combines with water, and afterwards the hydrate formed unites with carbonic acid. A magnesia which effervesces with acids must have previously become hydrated to a certain extent. The English heavy calcined magnesia appears to withstand hydration and carbonation much better than the light article; I have observed that it may become quite solid by the absorption of water and still be free, or contain mere traces of carbonic acid. If a good quality of this magnesia is used in the proportion of 100 grains to 450 grains of citric acid, a clear solution is not obtained, and, on standing, a considerable precipitation takes place. Repeated experiments made with this magnesia have shown that between 85 and 90 grains of it are sufficient for the citric acid. 85 grains is about two-thirds of $126\frac{1}{3}$ grains, the quantity calculated above as furnishing neutral citrate of magnesia.

These facts appear to me to demonstrate very clearly that the solution, instead of containing the neutral citrate, really contains

the two-thirds citrate of magnesia, or, in other words, that the compound $2MgO, HO, C_{12}H_5O_{11}$, and not the one with 3MgO, is the citrate retaining its solubility in water.

It would be interesting, from a chemical as well as pharmaceutical view, to institute investigations to this effect with pure anhydrous magnesia or its carbonate of known composition, and with well determined citric acid. The two-thirds citrate, I believe, has been prepared but once (by Heldt), and nothing is known concerning it, except that it is a gummy mass. Might it not perhaps be obtainable in a dry state, and retain its perfect solubility?

But herewith the practical difficulties would not be overcome, to prepare the solution of uniform quality. The method suggested by Fred. Stearns, in the Proceedings of the American Pharmaceutical Association, 1857, page 152, is objectionable chiefly on account of the impossibility of preparing the solution on the small scale or at short notice, and a loss of magnesia is very likely to occur during the filtration of the dissolved bicarbonate. Although this solution contains a large excess of free carbonic acid, this is expelled by filtration, and the filtrate containing no uncombined carbonic acid, or merely traces of it, is apt to deposit neutral carbonate unless used without delay.

The analyses, by Phillips, Townes, Otto and Lake, of commercial samples of subcarbonate of magnesia, agree very nearly in the percentage of magnesia, which they found to vary between 40·3 and 42; and with this inconsiderable variation, it might perhaps be advisable to return to the use of the carbonate in the preparation of the liquor magnesiæ citratis. 85 grains MgO are contained in about 210 grains of carbonate; and this amount yields, with 450 grains of citric acid and 40 grains bicarbonate of potassa, an agreeable solution. I have not tried whether more carbonate can be dissolved to a permanent solution.

While on this subject, it may as well be remarked that the amount of syrup of citric acid (two fluidounces to the bottle) ordered by the Pharmacopœia is entirely too much for the large doses requisite of this medicine; one-half the quantity is amply sufficient, producing a solution which is pleasantly sweetened.

In regard to the manipulation, I have often observed young pharmaceutists to add all the magnesia at once to the solution of, or to the partly undissolved acid. The necessary consequence is, that a portion of neutral citrate is formed in the hot liquid, which cannot be dissolved by subsequent trituration, and must be filtered off, thus occasioning a loss of both citric acid and magnesia. The proper way to proceed is to add the magnesia in small portions to the solution of the acid, or, better still, to suspend the magnesia in water and add it gradually, waiting each time until the solution is almost complete.

The proportions which I have used with uniformly good success are as follows: 450 grains citric acid, 100 grains light calcined magnesia, containing a minute quantity of carbonate (or 90 grains heavy magnesia, free from carbonate), 40 grains bicarbonate of potassa, 1 fluidounce syrup of citric acid, and sufficient water.

PHARMACEUTICAL ITEMS.

By William C. Bakes.

Under this title we propose to publish during the year a series of articles on practical subjects, in which we shall include, as far as possible, formulas for the various new preparations issued, and other matters coming under our observation of interest to Pharmaceutists generally.

"*Camphor Ice.*"

This is the popular name given to a preparation much used during the winter season as an application to chapped and abraded skin. Many pharmaceutists make a *specialty* of it, and find a large sale for the various combinations sold under this name. The following formula yields an elegant preparation, besides the merit of being economical and readily made:

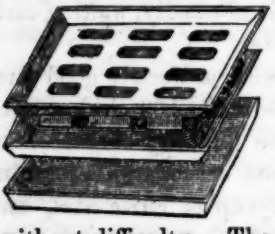
Take of	Powdered camphor,	2 ounces.
	White wax,	4 "
	English oil lavender,	2 drachms.
	Benzoated suet,	1 pound.

Melt the suet and wax together, and when nearly cool add the

camphor and oil of lavender, and pour into moulds of convenient shape and size. Glycerine and other substances are sometimes added with a view of increasing its efficiency and adding to its popularity.

Camphor Ice Tray.

In this connection it might be well to speak of an arrangement for moulding camphor ice and other fusible solid substances. This consists of a tin tray, as seen in the drawing, containing a



number of stationary moulds, which is arranged to set in a shallow tray. The melted preparation is thrown into the moulds, and a small quantity thrown into the lower tray serves as a luting; when cold the surplus material may be scraped off and the tablets pushed out without difficulty. The moulds should taper about an eighth of an inch to facilitate the removal of the tablets, and the whole apparatus should be made with much nicety in order to work satisfactorily.

Cocoa butter may be readily moulded, and forms one of the nicest applications for chapped hands, lips, &c., possessing a pleasant taste and odor and very emollient in its effects.

"*Perfumed*" or "*Flower scented*" *Glycerine*,

Is among the "*Winter requisites*" sold by many Pharmaceutists. This is conveniently and readily prepared by triturating any of the *extracts*, such as heliotrope, millefleur, jasmine, &c., with carbonate of magnesia, in the manner directed for the medicated waters. The perfumed water thus obtained is mixed with an equal bulk of glycerine.

Prescription Checks.

In establishments doing a large prescription business, there is great liability to error in dispensing medicines to the wrong customer. This has been known to occur and though perhaps no serious results have ever taken place, the mere possibility of an error should lead us to guard against every probable tendency in that direction. Mr. Henry Cramer, of this city, has used for many years a prescription check, and found it

to answer a good purpose. The form is similar to the following. The full size would be too large for convenient insertion here :

For	For	Retain this check until the prescription is compounded, or if it is inconvenient to wait, let the check be presented by the person who calls for the medicine.
Pres. of Dr.	Pres. of Dr.	
No. Price.	No. Price.	
$	$	Name and address of the Pharmaceutist.

The left hand portion is retained by the Pharmaceutist, and the other given to the patient. As an additional caution a couple of lines are drawn with a pen or pencil obliquely across the line separating the part retained from that given to the customer; when the check is returned the lines on it must correspond with those on that held by the dispenser when the two edges are placed together. Pencils of various colors might be used by different assistants in the same establishment; this would show any difference at a glance, and might prove an important distinction in large establishments.

Balsam of Peru.

A test for distinguishing the difference between the *true* and *sophisticated Balsam of Peru.* When a drop or two of the true balsam of Peru is placed upon the tongue it produces a liquid diffused impression, whilst the sophisticated being generally a solution of resin, which deposits the resin on the back of the teeth and on the tongue.

We are indebted to Mr. W. J. Jenks for this simple test, which may be relied on as furnishing a convenient method of detecting the true from the false balsam of Peru.

ON LIQUOR FERRI PERACETATIS.

By John M. Maisch.

In the sixth edition of the Prussian Pharmacopœia this preparation was officinal under the name of liquor ferri acetici, and was prepared by precipitating a solution of sesquichloride of iron with ammonia, and dissolving the washed hydrated oxide of iron in acetic acid.

The seventh edition of this Pharmacopœia has changed the

name to Ferrum aceticum solutum, and improved the process by employing protosulphate of iron as the source for the hydrated sesquioxide.

Of late this preparation has been employed to some extent by physicians of this city; it was at least prescribed, though probably rarely furnished. I have seen a specimen pretending to be the solution of the Prussian Pharmacopœia, which was so unlike to it in its physical properties that it could not have been prepared by its formula, or else the whole manipulation was wrong and the preparation spoiled.

It is well known that dilute solutions of neutral persalts of iron are colored deep brownish red by all acetates; this color disappears on the addition of a very slight excess of any of the stronger acids, but it becomes deeper if the liquid is rendered more alkaline. The preparation in question contains eight per cent. of metallic iron in the form of a two-thirds basic salt ($Fe_2 O_3$, 2 $\overline{A}c$), and it is evident, from this proportion and the reactions just stated, that it must be of a very deep brown red color. This is really the case, the coloration being of such intensity that the solution is transparent only in thin layers.

The following is the formula of the latest edition (1862) of the Prussian Pharmacopœia: 40 parts of pure protosulphate of iron are oxidized in the usual way to tersulphate; the solution is precipitated by ammonia, the resulting hydrated sesquioxide of iron is well washed with water, and the excess of this liquid, which is mechanically retained by the bulky precipitate, is expressed between linen surrounded by bibulous paper. The hydrated oxide of iron weighs about 32 parts. It is now mixed with 64 parts of acetic acid, spec. grav. 1·038,* containing 29 per cent. of glacial acetic acid, and the mixture is agitated until a perfect solution is effected, which is strained through linen, the strainer being washed with sufficient water to make the preparation weigh one hundred parts. It is of a deep red brown color, has a specific gravity of 1·134 to 1·138 and contains eight per cent. of iron.

To succeed in obtaining a perfectly stable preparation, a few

* This is the *Acidum aceticum dilutum*, or *Acetum concentratum*, of the Prussian Pharmacopœia.

cautions must be observed, which, if disregarded, will produce a solution, prone to change, occasioning the precipitation of a large portion of iron, which once separated cannot be redissolved again by the further addition of acetic acid.

In the first place it is indispensable to entirely sesquioxidize the iron; if a portion should remain in the state of protoxide, a proto-peroxide would afterwards be precipitated, which is either not entirely soluble in cold acetic acid, or if dissolved, would render the solution prone to change through its affinity for oxygen.

The tersulphate of iron as well as the ammonia should be considerably diluted with water, and the alkali kept in excess. This is accomplished by using more than an equivalent quantity of ammonia, and by pouring the diluted iron solution into the diluted ammonia. A pure hydrated sesquioxide is then precipitated free from basic salt. The non-volatile alkalies are not so well adapted for this purpose, because the precipitate is apt to carry down a portion of them which cannot be removed by subsequent washing. The precipitation, moreover, must not be accomplished too rapidly, in order to avoid the partial heating of the liquid at the points of contact with the precipitant, whereby the ferric oxide would be precipitated in a different state of hydration, being then insoluble or readily separated from its solution in acetic acid.

The hydrated oxide must be washed with water and expressed until it is entirely free from sulphate of ammonia; solution of acetate of iron is gradually precipitated in the presence of other salts.

The acetic acid must be of the proper strength. If stronger than directed a neutral peracetate (Fe_2O_3, 3 $\overline{A}c$) will be formed; if too weak, or if the oxide should be in excess, a more basic salt is obtained, which is at first perfectly soluble, but is rapidly decomposed by precipitating oxide of iron, or probably a very basic acetate, leaving neutral acetate in solution.

Heat must not be applied, either during the precipitation or washing of the sesquioxide, or during its solution in acetic acid. In the former case the state of hydration will be altered as stated before; in the latter case the oxide will at first dissolve but soon precipitate wholly or in part. Solution of peracetate of iron

may be completely decomposed by exposing it to the boiling temperature.

Finally, the finished preparation must be protected against too strong a light as well as against too high or too low a temperature, and against the frequent access of the atmosphere. The solutions of all acetates are prone to change in contact with the air, and this change is hastened by the influence of light. On the other hand peroxide of iron, when in solution together with many organic compounds will readily be reduced to protoxide, more rapidly if light has free access to it or is aided by heat.

If these precautions in regard to manipulation and preservation are observed, the solution may be kept for a very long time without apparent change.

The preparation may be considered pure and correct if aside from the amount of acetic acid and of iron, it answers to the following tests:

Diluted with water it does not produce a precipitate with chloride of barium,—absence of sulphuric acid.

Acidulated with nitric acid, nitrate of silver occasions no precipitate,—absence of chlorides.

Diluted and precipitated by an excess of ammonia, the filtrate is colorless and leaves no solid residue on evaporation,—absence of some metals, acids and the fixed alkalies and alkaline earths.

Acidulated with muriatic acid and deoxidized by sulphurous acid or an alkaline sulphite, the colorless solution is not disturbed on the addition of hydrosulphuric acid—absence of the heavy metals.

The dose of this preparation is from three to ten drops, usually largely diluted with water, sweetened water or wine.

It is employed in the preparation of *tinctura ferri acetatis ætherea*, which is composed of nine parts (by weight) of the liquor, two parts of alcohol sp. gr. ·83, and one part of acetic ether.

This is the tinctura ferri s. nervina Klaprothii or æther aceticus ferratus Klaprothii, which is an agreeable preparation, much more acceptable to a delicate stomach than the liquor; it contains six per cent. of iron and is given in doses from ten to sixty drops several times daily, usually combined with cinnamon water or some other aromatic.

NOTE ON "ALCOHOLIZED IRON."

By the Editor.

A preparation of metallic iron, under this name, is imported from Germany, where it is employed for internal use in the manner of iron by hydrogen. Its general aspect is that of powdered plumbago, but with an ordinary pocket lens its particles are observed to possess metallic lustre, and are rounded and flattened, as would result from attrition. We have no very positive information relative to the commercial origin of this powder, or of the manner of its manufacture. Its invoice price is about forty cents per pound. It is said to be produced in western Austria, Styria, or the Tyrol, and it is supposed to be produced by attrition, in some cheap way, as by agitation on the gate of a saw mill, or steam machinery. The term "alcoholized" is common in Germany, and is applied to powders in the sense of a high grade of fineness and purity,—just as the term "æthereal" is applied to oils, signifying that they are highly rectified,—and hence does not indicate that alcohol is used in making them. Duflos (Chemischen Arzeneimitteln) describes this preparation under the name "*Ferrum pulveratum*," and gives the synonyms *Pulvis. s. Alcohol Ferri*, Limatura Martis levigata, Limaille de Fer porphyrisée, Fer porphyrisée, &c.

Alcoholized iron is readily attacked by cool diluted sulphuric acid, but not so quickly nor with such rapid effervescence as is good reduced iron. When an excess of acid is used, a small quantity of very fine black powder remains, suggesting the possibility of its being cast iron. The gas evolved was nearly all free from sulphur, but at the last, traces of H.S. are indicated when moistened carbonate of lead paper is suspended in the mouth of the flask.

Limaille de fer porphyrisée of French pharmacy is made by purifying iron filings from particles of other metals by aid of a good magnet, sifting out the first dust, if at all rusty, after first triturating them in an iron mortar; but it is better to begin with recent unoxidized filings. These are beaten in a thin stratum in a mortar in which the bottom is very flat, and the face of the pestle of corresponding curve, using the sieve from

time to time to remove the metallic dust. The operation is tedious and troublesome, and led M. Quevenne to the substitution of "Iron by hydrogen," which is more elegant and soluble, but much more costly. It should have been observed that the instruments used must be perfectly dry and free from dampness, and that the operation should be performed on a dry day.

Alcoholized iron is largely sold in New York (probably among German apothecaries), and is said to be often substituted for iron by hydrogen. The best of it cannot be far from equal to reduced iron, and it has the merit of not containing sulphur, so commonly observed in the commercial reduced iron.

It is to be regretted that some of the manufacturers of fine chemicals do not make reduced iron a speciality. The practical difficulties of the process are easily overcome and avoided by an intelligent operative, and, once acquired, no reason need prevent regular results. Cannot some of our friends take hold of it, and supply the market with pure metallic iron by hydrogenic reduction, free from sulphur, and of a light spongy texture, at a price that will bring it into more general use?

ON A PREVIOUSLY UNPUBLISHED METHOD OF MANUFACTURING PILLS ON A LARGE SCALE.

By Edward Parrish.

Some years ago I came to the knowledge of a process for making pills in the large way, which I did not feel at liberty to communicate from fear of compromising the interests of an ingenious practical confectioner who was, for a short time, in my employ. Considering this motive no longer binding, I offer to Pharmacists the following process:

Having granulated a suitable quantity of sugar, separate the smaller and larger granules by sieves, so as to bring the whole to a uniform degree of coarseness. Now prepare a clean copper pan of suitable size, suspended by a rope or chain two or three feet above a small furnace containing a charcoal fire; introduce the granules, moisten them with thick mucilage or syrup, and dust over them the ingredients to constitute the pills, which must have been previously reduced to very fine powder and thoroughly

mixed; now, by a rapid and dexterous rotary and shaking motion of the pan and its contents, diffuse the powder equally over the moistened granules till they are completely and uniformly covered, they will soon require additional moistening and another supply of the dry powder, which on further rotation will be pretty evenly distributed. By repeating the process of moistening and dusting with the constant and skilful application of the combined rotary and shaking motion, pills will be formed which will be perfectly round and nearly uniform in size. When nearly of the required size a sieve is used of the previously ascertained proper number of meshes to the inch, by which those yet too small are returned to the pan for further treatment, while those which have attained sufficient size are separated. If any are too large they should be reserved for drying and powdering, and may then be mixed with more of the powders and made over again. The chief art in making pills by this process lies in the regulation of the temperature and in a dexterous manipulation, by which the moistened granules and pills are prevented from adhering together and rendered perfectly round.

The pan should never be allowed to get hot—never more than moderately warm, it should be grasped by the left hand, with which the motion is imparted to it, while the right hand is used to prevent the pills adhering and to aid their rotary motion upon the bottom of the pan and upon each other.

A remarkable feature of this process is its adaptation to large quantities. I have never known it tried with less than several pounds of the ingredients, and though some trials have proved rather abortive it has generally produced very uniform and round pills. Compound cathartic and rhubarb pills in charges of ten pounds succeed particularly well. A lot of pills of reduced iron was quite spoiled; they were flat and ill-shaped, probably too heavy to remain round when softened by the heat. Experience will, of course, indicate variations from the process, but the principle is generally applicable to substances obtainable in dry powders. Of course much care is required in adjusting the size of the pills; the granules add slightly to this, although the absence of the pressure applied in the process of trituration and in rolling and cutting, may render the pills by this process

relatively larger; on the other hand, by the aid of heat, a smaller proportion of liquid excipient is necessary than by the ordinary process.

An obvious advantage of this process, which will suggest itself to large manufacturers of pills, arises from the fact that the apparatus employed is precisely that used in sugar-coating, and in possession of all those who practice that art.

Of course I make no claim to originality in regard to this process. It has evidently been long in use by some manufacturers of French proprietary pills, as may be ascertained by cutting some of these in half, when the granules will appear in the centre.

ALUM CRYSTALLIZATIONS OVER FRESH FLOWERS.

By W. P. Creecy.

Editor American Journal of Pharmacy;

In one of your recent numbers I saw that science had found its way back to childhood, in the shape of "soap bubbles;" and I will, with your favor, turn it in another equally interesting light channel, and tell you what you already know, perhaps:—how to make baskets and flowers ornamental, even in the midst of winter, by crystallizing them with alum.

Make fancifully-shaped baskets of pliable copper wire, and wrap them with gauze. Into these *tie to the bottom* violets, ferns, geranium leaves, crysanthemums,—in fact, any flowers except full-blown roses,—and sink them in a solution of alum of one pound to the gallon of water, after the solution has cooled; as the colors will then be preserved in their original beauty, and the crystallized alum will hold faster than when from a hot solution. When you have a light covering of distinct crystals that cover completely the articles, remove carefully, and allow them to drip for twelve hours.

These baskets make a truly beautiful parlor ornament suspended in the centre of a room, and for a long time preserve the freshness of the flowers.

Vicksburg, Miss., Dec., 1866.

ON EXTRACTUM COLOCYNTHIDIS ALCOHOLICUM, U. S. P.

By William Procter, Jr.

In the formula for this preparation 48 troyounces of colocynth is directed to be deprived of its seeds, ground and treated with diluted alcohol, first by maceration and expression and afterwards by percolation, until two gallons of tincture is obtained, which is then distilled to recover ten pints of alcoholic liquid, the residual liquid in the still being evaporated to dryness and powdered. Thus made, the product should weigh seven troyounces.

Having occasion to treat 48 troyounces of colocynth in making the compound extract, it was deprived of seeds and weighed 12 troyounces; this was ground, macerated several days in five pints of diluted alcohol and strongly expressed, to get four pints of liquid; the residue, packed closely in a percolator, was treated slowly with diluted alcohol till five pints had passed, or until the passing liquid was but slightly bitter. The alcohol was recovered, the residue evaporated to dryness and powdered, when it weighed *three and a quarter troy ounces*, about 6·8 per cent.

This result occasioning some surprise, four troyounces of the same lot of colocynth was treated; the proportion of pulp was a little larger, and the whole drug, unbroken seeds and all, was moistened with diluted alcohol, packed and percolated directly with diluted alcohol, until the full pharmacopœia quantity of tincture had passed. This, on evaporation, yielded 200 grains of extract, equivalent to 9·6 per cent. In the latter case the seeds were treated with the pulp, without bruising, and a larger quantity of menstruum used than in the first operation, yet not coming up to the pharmacopœia quantity. Seeing this variation in yield would have a marked influence on the compound extract, it occurred to me to seek the experience of Dr. E. R. Squibb in regard to the yield of simple extract, knowing that the manipulation of the officinal processes was in the main of his suggestion, though modified somewhat in the Committee of Revision. I accordingly wrote to him for a copy of his results, with permission to use them in this paper, which he cheerfully and very freely gave me as follows:

"*My dear Sir,*—In looking over my note book, at your request, back to 1857, I find only two records of ascertained proportion of seed and pulp in colocynth. In one the pulp weighed 26·03 per cent., and in the other 26·23 per cent. I have long since ceased to ascertain the proportion between seed and pulp, and simply grind the whole up in a mill which *will be sure not to break* the seed, and then percolate the whole together. The results of these percolations are as follows:

1860. March	100 lb.	"		colocynth, yield	14 lb.	8	oz.	simp.	ext. or	14·5	p. ct.
Oct.	280	"		"	40	" 8	"	"	"	14·46	"
1861. Jan.	45	"		"	6	" 2½	"	"	"	14·	"
July	300	"		"	48	" 6	"	"	"	16·2	"
Sept.	544	" 8		"	85	" 6	"	"	"	15·7	"
Dec.	197	" 8		"	31	" 0	"	"	"	15·7	"
1862. Jan.	315	" 3		"	50	" 8	"	"	"	16·03	"
April	250	"		"	34	" 8	"	"	"	13·8	"
May	224	" 6		"	30	" 8	"	"	"	13·7	"
June	262	"		"	38	"	"	"	"	14·5	"
July	246	"		"	36	"	"	"	"	14·6	"
Aug.	264	" 8		"	35	" 10	"	"	"	13·5	"
1863. Feb.	236	" 9		"	33	" 12	"	"	"	14·3	"
April	506	"		"	66	" 14	"	"	"	13·1	"
July	605	" 13		"	90	" 12	"	"	"	15·*	"
Nov.	643	"		"	93	" 4	"	"	"	14·46	"
1865. March	925	"		"	125	" 8	"	"	"	13·5	"
July	1080	"		"	122	"	"	"	"	11·3	"
Sept.	2686	"		"	334	"	"	"	"	12·4	"
Dec.	240	"		"	32	" 2	"	"	"	13·4	"
	995 lb. 7				1349 lb. 4½					13·56*	p. ct.

"With the exception of the last four parcels all this colocynth was selected and purchased by me. The last four parcels, 4931 lbs., were purchased by the U. S. Government, and the simple extract was made from them for the Government. All my purchases were of good fair quality and only varied as the market for good quality varied. That bought by the Government was not so good, and a portion of some parcels being damaged was separated and thrown away. This does not enter into the weights as given. If the whole weight had been taken the yield would have been lower yet. I cannot reconcile your results with the above table. You will have to try

* Nearly.

again. All my extract was made by percolation alone—no expression used.

"There is one other point in regard to colocynth to which I intended to have directed your attention, but forgot it.

"The size of the apples has comparatively little to do with either the quality or quantity of extract yielded to the menstruum. And their being whole or broken up only affects the proportion of extract from the circumstance that, in hauling cases or casks, the heavier seed shake down to the bottom of the package, or that opposite to the marked side, so that a given weight taken from the top or marked side of a package will always yield more extract than a like weight taken from the middle of the same package, and much more than if taken from the bottom, and beside this, as the cases are usually made of very thin boards, and get split and broken in hauling, the seeds shake out through the crevices, and often make deficient weight but yield more extract. The more recently-adopted plan of importing it compressed, in bales to save freight and packing cases, obviates these causes of variation, but the drug then is usually found damp, and will begin to lose weight as soon as exposed to the air. From this cause alone bale or compressed colocynth yields less extract, and it is not yet a popular form of importing it in the market.

"But the most important point of all in judging the quality of colocynth is the indication given by the seed of the maturity or immaturity of the apples, the mature fruit of course yielding the largest proportion and best quality of extract, even though the proportion of pulp to seed be greater, as is always the case in immature apples. The plump, full, heavy seed, of a fine olive color, no matter whether small or large, indicate mature fruit; and where these are found in greater proportion the drug is always best, no matter whether broken or whole. The flat, shrivelled or shrunken light seed, of a white or pale yellow color, indicate unhealthy fruit, or fruit gathered before maturity; and such, though succulent and mucilaginous, yield a light colored extract in small proportion to alcoholic menstruæ.

"Every parcel of colocynth contains not only these two kinds

of seed, but also all grades of condition and color between them, and judgment is necessary to decide upon the proportion in which the mature seed occur in different parcels or shipments."

The careful manner in which these results were obtained and recorded, the large quantities treated and the remarkable approximation of the yields entitle them to credit as a valuable addition to our knowledge.

The colocynth used in my experiment was unbroken, generally of good shape and no excess of seeds, which were mostly well matured. As the letter of Dr. Squibb does not allude to the quantity of menstruum used, the inference is that he employed the officinal quantity. In my percolations most of the solid extract was obtained in the first third of the percolate, and the only way to reconcile the difference between our results is either by supposing a difference in the proportion of soluble matter in the drug or that the menstruum varied in strength or quantity.

When the present formula for compound extract of colocynth was adopted the Committee of Revision determined to use scammony resin in lieu of the variable scammony, employing 75 per cent. of the weight of the scammony formerly directed. The idea of the present pulverulent form of the extract was suggested by Dr. Squibb, (see Amer. Jour. Pharmacy, vol. v. 3d series, p. 97, 1857.) The proportion of simple extract of colocynth to substitute the original six troyounces of pulp was also adopted from the results of that paper, viz.: three and a half troyounces, or about 60 per cent. Now a question worthy of investigation is to ascertain if the simple extract as obtained from several lots of colocynth is the same in strength—or is variable—and whether the increased proportion of extract is made up of inert matter. On this will depend the propriety of returning to the use of the extract from a given weight of pulp rather than to fix the quantity of simple extract. Perhaps the case could be met by using alcohol of 85 per cent., so as to take out only the resinoid matter.

Whilst on this subject it may be well to mention that several physicians have found fault with the officinal compound extract of colocynth because of its great activity and griping

effects. This has doubtless arisen from not graduating the doses to suit its increased power, compared with the old extract, and also from deficiency in the carminative power of the corrigent cardamom. Although Dr. S. originated the mixed powder recipe, he subsequently changed his view and urged on the Committee the propriety of first forming an extract, drying and repowdering, for the reason that the soap operates favorably in modifying the aloetic and resinous ingredients. In querying in reference to this point and to the use of commercial scammony resin, in my letter to him, he replies as follows:

"I always make my resin of scammony from the commercial scammony, and of late can always get this good, 75 to 80 per cent. I have never used the McAndrew's resin, and never will until the Pharmacopœia orders it. My objection to it is the same that I should have if it was proposed to use extract of lettuce instead of lactucarium. One may be as good as the other, but we don't know it. And if we are to substitute at all, I favor resin of May apple instead of scammony, that is for the Pharmacopœia.

"I do not powder the ingredients for the compound extract except the cardamom seed, but simply have them all dry and brittle, so that they might be powdered. I then melt them together (without moistening) and when a smooth uniform hot mixture is made, I stir in the cardamom powder after the steam is shut off the kettle. I still think this important for the reasons I gave the Committee, and the chief reason is that the soap and aloes, when heated together, chemically combine, and form a soluble compound, or at least more soluble than the resins would be uncombined. Beside this it makes a much nicer and more artistic preparation, and is better pharmacy as well as better therapeutics, notwithstanding that you all thought otherwise. My practice and information has also confirmed my proposal to increase the proportion of aromatics, which you rejected. Most of those who use the comp. ext. most intelligently combine it with capsicum. And I think I may safely say I have lost the sale of hundreds of pounds of it through its tendency to gripe, which is no fault of mine but of the Committee. Those who know how to combine it use and value it

much. But I believe the same skill in the use of podophyllum would find that better for most of the uses to which it is applied. You are fully at liberty to use any and all the above just as you please, and I have been a little careful about the statements in order that you may safely use them."

From this it will be seen that the writer advocates a more powerful carminative ingredient and the union of the whole mass as an extract before powdering; and when we consider the risk of not getting the powders intimately and uniformly mixed by the present method, and the very good reasons, pharmaceutic and therapeutic, offered by Dr. Squibb in favor of the combination method, I do not hesitate to recommend its adoption, and would suggest to physicians the propriety of using oil of cloves or capsicum as an addition to the extract in pilular form, to correct its griping tendency.

ON EMPLASTRUM PICIS CUM CANTHARIDE.

By Geo. C. Close.

The question referred to me for an answer is:

"What change can be made in the composition of Emplastrum Picis cum Cantharide that will render its consistence firmer in warm weather?"

It will be seen by referring to the Pharmacopœia that this plaster is directed to be made by melting together, in a water bath, 43 troyounces of Burgundy pitch, with 4 troyounces of cerate of Cantharides. It appears to me that the want of firmness in the above composition, when exposed to the summer heat, must depend upon the proportion of lard contained in the cerate of Cantharides. To obviate this I propose to substitute the Burgundy pitch plaster for the Burgundy pitch, and to add Cantharides in powder, instead of cerate of Cantharides.

The formula would then be—take of Emplastrum Picis Burgundicæ 50 troy ounces and 320 grains; Cantharides, in very fine powder, 1 troy ounce and 160 grains. Melt the plaster by means of a water bath, then add the Cantharides and stir constantly until the mixture begins to thicken on cooling.

The above quantities may be reduced as follows:

Emplastrum Picis Burgundicæ 5 troy ounces and 32 grains;

Cantharides, in a very fine powder, 64 grains, or what would be sufficiently accurate, 4 troy ounces of the first and 50½ grains or 50 grains of the other.

I present some samples.

No. 1, is made by the officinal formula, using true Burgundy pitch.

No. 2, is made by the formula proposed as a substitute for the other, but using the American imitation of the pitch.

No. 3, by the proposed formula, using true Burgundy pitch.

No. 1, I find is softer than the others at a temperature of 70° and over, but cracks more readily when reduced to 60°. I perceive no difference between No. 2 and No. 3 in consistence, the American Burgundy Pitch appearing to answer equally as well as the true.

The better consistence of the plaster made by the proposed formula I attribute partly to its containing more wax than the officinal, the wax being but slightly effected by the temperature until it nearly reaches its melting point.

This also prevents its cracking when exposed to the cold, which I think is of some importance, though not embraced in the question.—*Proc. Am. Pharm. Assoc.*, 1866.

NOTE ON THE PREPARATION OF IODIDE OF AMMONIUM.

By James F. Babcock.

Having occasion some time since to prepare this salt in considerable quantities, my experience with the various processes laid down in the books may not be uninteresting.

The first process tried was that of Spencer, (*U. S. Dispensatory, 12 Edition, p.* 1537), which consists of adding hydrosulphuret of ammonia to iodine until the red color due to the solution of iodine in iodide of ammonium has disappeared. Iodine displaces the sulphur, and the liquid filtered to separate the deposited sulphur is evaporated to dryness.

The deportment of the iodide of ammonium thus formed showed that the decomposition of the hydrosulphuret involved the formation of certain combinations with sulphur, traces of which obstinately adhered to the iodide of ammonium produced, and in time, even when excluded from light, its color changed to

yellow and finally to brown, evolving free iodine, which, of course, made it unreliable by varying the proportion of iodine contained in it, and hence unfitting it for accurate preparations, particularly in photography, in which, of late, it has had such an extensive use. Trials in various ways failed to remove completely the last traces of the sulphur compound alluded to above, and the process was finally laid aside for others, in which the preparation of hydriodic acid and its subsequent neutralization with carbonate of ammonia were necessary.

Different methods for preparing the acid were accordingly made use of, the first being that of the U. S. Pharmacopœia of 1860. It will be remembered that this is based upon the action of hydrosulphuric acid upon iodine. A quantity of hydriodic acid was accordingly prepared, and after separation of sulphur, carefully neutralized with carbonate of ammonia and the whole evaporated.

It was found, however, that the iodide of ammonium produced by this method decomposed in precisely the same manner as that prepared by hydrosulphuret of ammonia, and that traces of sulphur (which probably exists in combination with iodine) continued to be present, and ultimately determined the separation of iodine from its combination.

It will be noticed that this involves the interesting subject of the purity of the hydriodic acid, as prepared by the process of the pharmacopœia, and also the question, whether the tendency of hydriodic acid so produced to change color, is not partially due to traces of sulphur introduced during its preparation.

Granulated lead and iodine, according to Gmelin, (vol. ii. p. 267), shaken together with water until the solution was colorless, and the lead then precipitated by hydrosulphuric acid, was unsatisfactory, it being found that wherever sulphuretted hydrogen or alkaline sulphides were used in the preparation of iodide of ammonium, the salt produced was always liable to decomposition, even in the dark.

One part of phosphorus was melted in forty parts of water, and to the mixture twenty-four parts of iodine gradually added, with constant stirring, gave a solution of hydriodic and phosphoric acids. This was neutralized by carbonate of baryta,

forming insoluble phosphate of baryta, and soluble iodide of barium. This, by double decomposition with sulphate or carbonate of ammonia, gave iodide of ammonium free from objections due to the presence of sulphur.

Iodide of zinc and iodide of iron, by decomposition with carbonate of ammonia, gave equally satisfactory results.

These processes, however, were liable to the objection that, in the precipitation of carbonate of iron or zinc, or in the separation of phosphate of baryta, and afterwards of the carbonate or sulphate of baryta, the necessary amount of washing of these bulky precipitates, to avoid loss, involved so much time and consequent exposure, that it was almost impossible to obtain a salt which did not contain free iodine. The large amount of water necessary to wash out the last portions of soluble iodide from the precipitates required considerable time in boiling to the crystallizing point, and the iodide of ammonium, an unstable salt at best, always suffered. It was desirable, therefore, to make use of a process involving as little delay in the manipulation as possible, and a method was finally adopted, which was described in the London Chemical News, April 9, 1864, and also in the American Journal of Pharmacy, May, 1864, p. 245. It is undoubtedly the best at present in use, being capable, with slight modifications, of producing a salt absolutely pure and free from the objections to which the previous processes I have mentioned are liable.

It consists in the double decomposition of pure iodide of potassium and pure sulphate of ammonia, both of which are easily procured. Iodide of ammonium and sulphate of potassa are formed, and the latter separated by the addition of 15 or 20 per cent. of alcohol, and the whole evaporated to the crystallizing point. I have found the following proportions to give satisfactory results :—

Iodide of potassium,	5	parts by	weight.
Sulphate of ammonia,	2	"	"
Water,	4	"	"
Alcohol, 95 per cent.,	1	"	"

The salts are dissolved by heat in the water, which, on cooling, deposits a large proportion of the sulphate of potassa, and

when at 60° F., is mixed with the alcohol, which separates all but about one per cent. of sulphate of potassa, and the concentrated solution of iodide of ammonium, after evaporation, yields crystals of perfectly white iodide. Subsequent addition of alcohol separates the whole of the sulphate of potassa from the mother liquor, which, on evaporation to dryness, furnishes an additional quantity of the salt. The evaporation should be performed in the dark, or in the evening by gas-light, to give the best results. The solution being very concentrated, requires but comparatively little boiling, and the precipitate of sulphate of potassa being crystalline, is easily separated by filtration.

The proportions stated above gave four parts of pure iodide of ammonium, which is nearly the whole of the theoretical quantity. Iodide of ammonium by this method remains white, if carefully dried, even on exposure to light and air for a considerable period, and has been found perfectly reliable in composition, and satisfactory in all its applications in photography and pharmacy. —*Proc. Am. Pharm. Assoc.*, 1866.

ON SUBSTITUTES FOR ETHER AND ALCOHOL IN THE PREPARATION OF THE OFFICINAL OLE-ORESINS.

By H. N. Rittenhouse.

The present exceedingly high price of alcohol and its products having become so serious a question to the pharmaceutist and chemical manufacturer, as well as the community at large, it has become an object of importance to devise, if possible, cheaper agents or more economical methods than are now employed in effecting the requirements of the Pharmacopœia in its products.

With the single object of economy in view, it had occurred to me, before accepting the above query, that perhaps benzine, glycerine or fusel oil might, in this case, be useful, to a certain extent, in effecting a saving of ether in the preparation of the officinal oleo-resins, by displacing the ether with them remaining in the dregs.

I have not in this paper aimed at giving exact results, chiefly because I had neither the time or appliances for doing so. The subject of this query, being an important one, has been, and

might be still further, profitably pushed in other directions where it would be of more importance than in this immediate connection.

The uniformity of the methods of preparing oleo-resins is such that what would apply to one would to all. I therefore selected cubebs for my experiments, it being the most important and the type of its class.

Without going into detail of the various trials, it will be sufficient to give the general results of my observations.

The Pharmacopœia directs 12 oz., troy, of cubebs to be percolated with ether until 24 fluidounces of percolate have passed. To obtain this quantity it is necessary to use about 36 fluidounces of ether, (the dregs retaining 12 fluidounces, or one-third the quantity used,) then recovering 18 fluidounces of ether by distilling the percolate. The dregs might also be made to yield some ether by distilling, where the appliances are at hand for so doing; but the labor and risk of accident is apt to counter-balance any saving from this source in most cases.

Four ounces, troy, of cubebs were packed in a funnel, and 6 fluidounces of ether poured over the surface in the usual way, and the funnel covered; when percolation had ceased, 4 fluidounces of benzine were added to the drug, and the percolation continued until 6 fluidounces of percolate was obtained, the last portions coming away almost colorless. Upon evaporating the last ounce spontaneously until it ceased to lose weight, twenty-five drops only of oleo-resin were obtained, while one ounce of the first four ounces, when treated in the same way, yielded two fluidrachms of oleo-resin, having all the characteristics of a good preparation without any odor of ether or benzine.

This experiment was repeated in various ways with glycerine, benzine and water, after the ether first added had ceased to pass, with about the same results, though the benzine was the most satisfactory. It was also tried with the other officinal oleo-resins, and the same general results obtained.

Benzine, I think, answers better than any other liquid as a substitute on account of its cheapness and volatile nature. In the quantity used, very little can pass into the percolate, and that little is easily dissipated. The percolation in one case was

continued after the first six ounces were obtained, but the odor of cubebs was very faint, and the color pale, almost colorless.

Prof. Procter, in the May number of the Journal of Pharmacy for this year, has given some important results in the preparation of the oleo-resin of cubebs. He there shows that the first percolate contains practically all or nearly all the medicinal virtues of the drug.

Dr. Squibb has also shown the same thing in his paper "On the Economy of Alcohol in the Preparation of Fluid and Solid Extracts," published in the March number of the same journal of the present year.

From the above reports, I think two conclusions may be drawn: 1st, That there is double the quantity of ether used in these preparations than is *absolutely* necessary; and 2d, That percolation may be stopped with advantage in this class of officinals much sooner than is now directed.

I do not claim that the drugs in this way are *thoroughly exhausted*, but for all practical purposes they are, and, as is seen, great economy will result in the use of the ether and alcohol directed to be employed. In short, "sacrifice the cheaper drug for the sake of saving the dear menstruum."

As these preparations do not, when finished, correspond in dose to any given quantity of drug, I think the following general plan might be employed with advantage:—

Take of the drug any convenient quantity; for each ounce thus employed, 1½ fluidounce of ether, and one ounce or q. s. of benzine. Pack the drug in a suitable apparatus, add the ether, and when it has ceased to pass, pour on the benzine in the proportion of one ounce to each ounce of drug employed, or until as much percolate has been obtained as equals the amount of ether used. Recover the ether by distillation in the usual manner.

With care in watching the process, the contamination of benzine is so slight as to be scarcely perceptible in the percolate, and not at all in the finished preparation.

Glycerine may be used instead of benzine, if preferred, as, in case any of it passes through, it being insoluble in ether, is easily separated. The oleo-resin of ginger differing somewhat

in its preparation, I offer the following as a modification of the officinal process :—

Four ounces of ginger, (Jamaica,) or any convenient quantity, are to be packed in a suitable percolator ; to each ounce of drug add one ounce of ether ; when this has ceased to drop, pour on the dregs one ounce of benzine for each ounce of the drug ; when percolation has ceased, distil the percolate, and finish the preparation in the usual way.

The resulting oleo-resin will be found to be a good preparation in every respect, and this without the use of any alcohol at all. In my experiments I used a good commercial article of benzine, and a common glycerine of sp. gr. 1200. They can both be obtained at a very low price. By their use, I think Query No. 14 can be satisfactorily answered.—*Proc. Am. Ph. Assoc.*, 1866.

Philadelphia, August 15th, 1866.

DEPORTMENT OF THE MOST IMPORTANT MEDICINAL ALKALOIDS WITH REAGENTS, AND A YSTEMATIC METHOD OF EFFECTING THE DETECTION OF THESE SUBSTANCES.

(Continued from page 544, Vol. xxxviii.)

(From Prof. C. R. Frezenius' Manual of Qualitative Analysis.)

I. Volatile Alkaloids.

The volatile alkaloids are fluid at the common temperature, and may be volatilized in the pure state as well as when mixed with water. They are accordingly obtained in the distillate when their salts are distilled with strong fixed bases and water. Their vapors, when brought in contact with those of volatile acids, form a white cloud.

1. Nicotina, or Nicotine (C_{10} H_7 N).

1. Nicotina, in its pure state, forms a colorless, oily liquid, of 1·048 sp. gr. ; the action of air imparts a yellowish or brownish tint to it. It boils at 482° F., suffering, however, partial decomposition in the process ; but, when heated in a stream of hydrogen gas, it distills over unaltered, between 212° and 392° F. It is miscible in all proportions with water, alcohol, and ether.

Nicotina has a peculiar, disagreeable, somewhat ethereal, tobacco-like odor, an acrid, pungent taste, and very poisonous properties. Dropped on paper, it makes a transparent stain, which slowly disappears; it turns tumeric-paper brown, and reddened litmus-paper blue. Concentrated aqueous solution of nicotina shows these reactions more distinctly than the alkaloid in the pure state.

2. Nicotina has the character of a pretty strong base; it precipitates metallic oxides from their solutions, and forms salts with acids. The salts of nicotina are freely soluble in water and alcohol, insoluble in ether; they are inodorous, but taste strongly of tobacco; part of them are crystallizable. Their solutions, when distilled with solution of potassa, give a distillate containing nicotina. By neutralizing this with oxalic acid, and evaporating, oxalate of nicotina is produced, which may be freed from any admixture of oxalate of ammonia, by means of spirit of wine, in which the former salt is soluble, the latter insoluble.

3. If an aqueous solution of nicotina, or a solution of salt of nicotina mixed with solution of soda or potassa, is shaken with *ether*, the nicotina is dissolved by the ether; if the latter is then allowed to evaporate on a watch-glass, the nicotina remains behind in drops and streaks; on warming the watch-glass, it volatilizes in white fumes of strong odor.

4. *Bichloride of platinum* produces in aqueous solutions of nicotina whitish-yellow flocculent precipitates. On heating the fluid containing the precipitate, the latter dissolves, but upon continued application of heat it very speedily separates again in form of an orange-yellow, crystalline, heavy powder, which, under the microscope, appears to be composed of roundish crystalline grains. If a rather dilute solution of nicotina, supersaturated with hydrochloric acid, is mixed with bichloride of platinum, the fluid at first remains clear; after some time, however, the double salt separates in small crystals (oblique, four-sided prisms), clearly discernible with the naked eye.

5. *Terchloride of gold* produces a reddish-yellow flocculent precipitate, sparingly soluble in hydrochloric acid.

6. Solution of *iodine in iodide of potassium* and water, when added in small quantity to an aqueous solution of nicotina, pro-

duces a yellow precipitate, which after a time disappears. Upon further addition of iodine solution, a copious kermes-colored precipitate separates; but this also disappears again after a time.

7. Solution of *tannic acid* produces a copious white precipitate, which redissolves upon addition of hydrochloric acid.

8. If an aqueous solution of nicotina is added to a solution of *chloride of mercury* in excess, an abundant, flocculent, white precipitate is formed. If solution of chloride of ammonium is now added to the mixture in sufficient quantity, the entire precipitate, or the greater part of it, redissolves. But the fluid very soon turns turbid, and deposits a heavy white precipitate.

2. Conia, or Conine (C_{16} H_{15} N).

1. Conia forms a colorless oily liquid, of 0·87 sp. gr.; the action of the air imparts to it a brown tint. In the pure state it boils at about 392° F.; when heated in a stream of hydrogen gas, it distils over unaltered; but when distilled in vessels containing air, it turns brown and suffers partial decomposition; with aqueous vapors it distils over freely. It dissolves sparingly in water, 100 parts of water of the common temperature dissolving 1 part of conia. The solution turns turbid on warming. Conia is miscible in all proportions with alcohol and ether. The aqueous and alcoholic solutions manifest strong alkaline reaction. Conia has a very strong, pungent, repulsive odor, which affects the head, a most acrid and disagreeable taste, and very poisonous properties.

2. Conia is a strong base; it accordingly precipitates metallic oxides from their solutions, in a similar way to ammonia, and forms salts with acids. The salts of conia are soluble in water and in spirit of wine, but nearly insoluble in ether. Hydrochlorate of conia crystallizes readily; the smallest quantity of this base, brought in contact with a trace of hydrochloric acid, yields almost immediately a corresponding quantity of non-deliquescent rhombic crystals, (Th. Wertheim). The solutions of the salts of conia turn brownish upon evaporation, with partial decomposition of the conia. The dry salts of conia do not smell of the alkaloid; when moistened, they smell only feebly of it; but upon addition of solution of soda, they at once emit a strong conia odor. When

salts of conia are distilled with solution of soda, the distillate contains conia. On neutralizing this with oxalic acid, evaporating to dryness, and treating the residue with spirit of wine, the oxalate of conia formed is dissolved, whilst any oxalate of ammonia that may be present is left undissolved. As conia is only sparingly soluble in water, and dissolves with still greater difficulty in solutions of alkalies, a concentrated solution of a salt of conia turns milky upon addition of solution of soda. The minute drops which separate unite gradually, and collect on the surface.

3. If an aqueous solution of a salt of conia is shaken with *solution of soda* and *ether*, the conia is dissolved by the ether. If the latter is then allowed to evaporate on a watch-glass, the conia is left in yellowish-colored oily drops.

4. *Concentrated nitric acid* imparts a fine blood-red tint to conia; *sulphuric acid*, a purple-red color, which subsequently turns to olive-green.

5. *Terchloride of gold* produces a yellowish-white precipitate, insoluble in hydrochloric acid; *chloride of mercury*, a copious white precipitate, soluble in hydrochloric acid. *Bichloride of platinum* does not precipitate aqueous solutions of salts of conia, the conia compound corresponding to ammonia-bichloride of platinum being insoluble in spirit of wine and ether, but soluble in water.

6. To solution of *iodine in iodide of potassium* and water, and to solution of *tannic acid*, conia comports itself the same as nicotina.

7. *Chlorine water* produces in a mixture of water and conia a strong, white turbidity.

8. If an aqueous solution of conia is mixed with a solution of *albumen*, the albumen coagulates. Aniline is the only other volatile vegeto-alkali which shows this reaction.

The volatile alkaloids are easily recognized when pure; the great object of the analyst must accordingly always be to obtain them in that state. The way of effecting this is the same for nicotina as for conia, and has already been given in the foregoing paragraphs, viz., to distil with addition of solution of soda, neutralize with oxalic acid, evaporate, dissolve in alcohol, evapo-

rate the solution, treat the residue with water, add solution of soda, shake the mixture with ether, and let the latter evaporate spontaneously. Conia is distinguished from nicotina chiefly by its odor, its sparing solubility in water, and its comportment with chlorine water, and bichloride of platinum.

ON THE SOURCE OF MUSCULAR POWER.

By E. Frankland, Ph. D., F. R. S.

At the conclusion of an elaborate paper, Dr. Frankland remarks:

We thus arrive at the following conclusions:—

1. The muscle is a machine for the conversion of potential energy into mechanical force.

2. The mechanical force of the muscles is derived chiefly, if not entirely, from the oxidation of matters contained in the blood, and not from the oxidation of the muscles themselves.

3. In man the chief materials used for the production of muscular power are non-nitrogenous; but nitrogenous matters can also be employed for the same purpose, and hence the greatly-increased evolution of nitrogen under the influence of a flesh diet, even with no greater muscular exertion.

4. Like every other part of the body, the muscles are constantly being renewed; but this renewal is not perceptibly more rapid during great muscular activity than during comparative quiescence.

5. After the supply of sufficient albuminized matters in the food of man to provide for the necessary renewal of the tissues, the best materials for the production, both of internal and external work, are non-nitrogenous matters, such as oil, fat, sugar, starch, gum, &c.

6. The non-nitrogenous matters of food, which find their way into the blood, yield up all their potential energy as actual energy; the nitrogenous matters, on the other hand, leave the body with a portion (one-seventh) of their potential energy unexpended.

7. The transformation of potential energy into muscular power is necessarily accompanied by the production of heat within the body, even when the muscular power is exerted ex-

ternally. This is doubtless the chief, and probably the only source of animal heat.—*Am. Journ. Science and Arts, November*, 1866.

WASTE OF PLATINUM IN SULPHURIC ACID MANUFACTORIES.

Some few years ago, M. Scheurer-Kestner, of Thann, made some careful researches as to the *amount* of the waste of platinum in sulphuric acid manufactories in which platinum alembics were used, and he found that, in an apparatus which, when regularly worked, yielded 4,000 kilogrammes of concentrated acid per day, each 1,000 kilogrammes of acid dissolved and carried away about two grammes of platinum, when the acid was tolerably free from nitrous vapors, and as much as four or five grammes of platinum when the acid was no freer from nitrous vapors than it is usually. He accordingly recommended that sulphate of ammonium should always be added to the sulphuric acid in the alembic, that salt being decomposed by the nitrous vapors, and its base combining with them and thereby rendering them inert. He found that the waste of platinum was very greatly diminished when this expedient was adopted. He found, too, that *new* alembics undergo less rapid waste than those which have been in use for some time, freshly-hammered platinum being more compact, and so less easily attacked by solvents, than platinum which has been long in use. Another most interesting fact which he established is, that platinum containing iridium is much more durable than platinum alone. He put into a still kept constantly at work, and so kept immersed in boiling sulphuric acid for two months, two capsules, one of pure platinum, and the other of platinum alloyed with iridium. At the end of the two months the capsule of pure platinum was found to be greatly deformed and its surface considerably corroded, and to have lost 19·66 per cent. of its weight, while the capsule of iridio-platinum retained its original form and brilliancy of surface quite unimpaired, and had lost only 8·88 per cent. of its weight. Since then, nearly all the platinum worked into alembics on the continent has been alloyed with a small portion of iridium.—*Journal of the Franklin Institute, December*, 1866, from *Lond. Mech. Mag., April*, 1866.

THE PHARMACEUTICAL BUSINESS—ITS MANAGEMENT.

By F. Stearns.

This theme, given me for an essay, I find upon reflection, if looked at as a commercial problem, is one which, for the whole of my own business life, I have been earnestly trying satisfactorily to solve, seemingly as far from that end now, at the end of at least the first half of a long business life, as at its beginning.

In confessing this, I had rather offer myself your pupil than teacher, and only the duty I owe you in accepting a query, induces me to pen a thought or so.

The ethical relations of Pharmaceutists and their æsthetical culture having been touched upon in former papers presented you, I will suppose that the *executive skill* exercised in conducting our business so as to make it successful pecuniarily is the real point in the query.

Slight observation shows to us that men are so different in ways of conducting the same business, that we find many distinct yet parallel ways of reaching the same end—pecuniary success. Each way may be consistent in itself, yet no two harmonious or rather consistent one with another.

Side by side does the penny wise and pound foolish man gather to himself money, and equally fast, too, with him who, of enlarged generosity and liberal tastes, deserves seemingly the largest reward. And in this race for substantial moneyed success, the intelligent man who prostitutes his profession in the employment of all means of quackery and dissimulation, often keeps pace with him who, having the same intelligence, energy and tact, strives to square his duty to the public by his actions toward that public. Perhaps in most instances the first one wins.

Of course the above comparison does not include conscientious considerations; it is rather drawn to show that when pecuniary success is the greater aim these widely apart parallels all lead to it. Again we see men who strive to be all things to all men, with whom "*policy* is the best *honesty*," who do try to leaven their course of business with a dash of righteousness, and *do* so cloak it with *hypocrisy* as to fancy after all that *they* only have discovered the happy, middle business course, which ends in moneyed success.

So far in life I am deluded with the fancy of considering money as a means not an end, and while I look with pity mingled with contempt on him in whom its possession merely is the sole gratification it affords him, it offers a pleasant contrast to turn to him of enlarged understanding, and liberal tastes who, the happy possessor of fortune, is the almoner of his own charities and patron of the noble in art.

It is an unquestioned fact that correct habits of life, such as diligence, temperance and the possession naturally of the qualities of energy, perseverance and hopefulness, as well as an understanding of the science of economics, are business requirements, regarded as necessary to moneyed success in ours, as in all other arts.

Rarely do we find in one person all these attributes, and as a consequence our fortunes vary.

Let me illustrate by examples. We find *A.* in business makes money rapidly, has a great run of trade, is looked upon enviously by the lesser lights, so called, yet this man may, by having no ideas of how economically to manage, save or invest his gains, —he either cares not or knows not—eventually lose the results accruing from his energy and power, while his neighbor, *B.*, with less facilities in every way, poorly educated, no capital, by means of perseverance and by the economical management of his gains, contrives to come out the winner in this moneyed race.

C. has a noble store in a popular street, elegantly fitted, in a large city, caters for what is called a first class trade, large expenses, extravagant ideas, works hard himself, always behind his counter, bids high for the patronage of his medical friends by gifts, perquisites and percentages, is in a constant and chronic condition of hurried business excitement, is royal in his subscriptions, fine in his living, does not stop the small leaks in his profits, is reckless in slow expenses, leaves his finances to some one not at all interested, is showy in expenses, abounds in non-paying attractions; compelled by these very items to *urge* business, to do a *large* business, the profits to the money he handles bears no fair proportions, so he leaves his condition in mourning once in five years.

D. has a small shop, less knowledge, but is bound to win; sells

Perseverance.

what he can get to sell; his own, only clerk, lives closely, sleeps in the place if single, lives over it if a man of family, always there, no time for church-going, or politics; gives twenty-five per cent. to his medical friends for the run of their prescriptions; if *C.* sells paregoric at 10 cents the ounce he sells it at 8 cents; the only extravagance he is guilty of is a *mental one*, that of believing himself to be, by so doing, a protector of the public from the swindling of his neighbor druggist, shouting in the street "buy of me, the public benefactor." And so he wins.

E. has the same small shop; bought it out, thinking that as he made a cool thousand or so in the corner grocery trade or as army sutler, he can sell drugs as well as sugar or tobacco. Proprietary nostrums being a perfectly safe field to work in, he cultivates it—has a whole Materia Medica bottled and boxed ready to his hand, and with the same honeyed eloquence that pushed the sale of sugar and tobacco he assists the sale of them; a familiarity with half of one per cent. of the words of the English language enables him to convince his customers that this that and the other of his is a little the best and a little the cheapest. Of course this *E.*, with no other aim, or no other knowledge, is building blocks of dwellings in the way of investment in a score of years or so.

To return to our subject, the proper management of Pharmaceutical business consists, in part, of knowing how to buy crude stock; convert this into saleable commodities; preserve it when so converted; handle stock with system and rapidity; and how to systematize and simplify office and financial duties. Other equally important ones, scientific education and experience are presumed to be possessed, so I pass to a moment's consideration of the points first named.

Purchase of stock: the dispenser in large places will best buy at home, at least so far as his market will let him, in limited quantities and often; this keeps the stock reduced in total value, while it may reach the fullest assortment and be always fresh. A saving of interest on an investment in a large idle stock, a good assortment of goods, though limited in quantities, well kept in hand (that is, remembered), will pay much better pro-rata than the vice-versa rule.

He who is more remote from a good market finds it necessary to buy in larger lots and, of course, with no greater capital than he of a city, must accordingly lessen his assortment. I have always thought it poor policy in the beginner in a small village, for the sake of making a show in doing business, to drag into his stock a lot of *groceries* or *paints* and *oils*, when the same capital invested in increasing his assortment of goods in our legitimate pursuits, while it would lessen perhaps the aggregate of his sales, would, in nine cases out of ten, increase his profits in a like proportion. Is it better to sell thirty thousand dollars per annum handling coarse goods to make up the bulk of it at no profit, or to sell half that in our line of goods with a profit equal to that on the former.

The judicious buyer who (supposing him to be a western man) goes to the larger markets twice or three times a year will devote considerable reflection upon his list of wants; a schedule of his purchases of the principal items during each year for previous years will assist in judging of quantities required. If the list be long and the purse narrow, of course proportions are to be still more carefully considered, if independent of this, those periods of general stagnation which occur from a thousand causes, often each year, for a few days or weeks are inviting in which to buy. It is only, however, the large operators, with unbounded capital, who are in the markets themselves, that can feel its pulse, and corner it too, that can take the real benefit of such ebbs and flows of trade tide.

When practicable, goods slowly bought, that is, more reflectingly, are better bought; do not crowd the fair work of a week into two days.

A knowledge of the value of the leading drugs, etc., in each month for the year and preceding years, affords a good rule to guide you in getting the best average how to buy.

In these days a system of brokerage has sprung up which is of much assistance to all buyers in the interior; men who, for a small commission, will purchase your list of wants perhaps better than you could yourself, by knowing the best sources of supply better than you.

He whose business is increasing and whose gains enable him

to, can in no way better invest his surplus profits than in buying the more staple or non-perishable articles of his stock in *original* packages; the difference is always so considerable, and, in fact, constitutes the profit of him who is called the jobber, who is between the importer or package dealer and the small buyer.

The druggist who possesses the appliances on his own premises to manufacture to any extent the various pharmaceutical products, etc., that his business requires, will certainly buy stock only in primary form, and save by such conversions the profit of him who manufactures for those who do not make for themselves.

This point of manufacturing in each shop all that is possible to make, so far as skill and appliances go, is so obvious that nothing farther need be said concerning it.

A means of economy lies in the proper arrangements to preserve stock, until it is sold, from the ravages of vermin, the effects of dust, heat, light, moisture, etc. Necessity has led many a thoughtful one in our line to devise means to this end, and throughout our periodicals and in our text-books you will find numerous suggestions bearing upon this point, so that hardly a preparation or drug but has in its history, description or formula, suggestions to this end. And this brings up the subject of our drug literature, as affording continually in its periodicals hints and suggestions of great economic value; it is, then, economy to be a liberal patron to these.

As an efficient source of economy lies in the facility of doing a large amount of labor with a comparatively small amount of clerk help, this facility may be and is to be only acquired by the systematic arrangement of stock and store fixtures so as to save every possible step, and to facilitate by every practicable means the rapid handling of goods. Every one who has been in business some years, knows by experience how improvements bearing on this point are continually forcing their necessity on him; this is instanced in the arranging of shop drawers and ware in a retail store, with reference to the center scale counter, so that those items most often required shall require the fewest steps to reach, and in the dispensing department by having the same drug in its various forms for instant admixture, enabling one in preparing recipes to dispense with much of the preliminary labor. I can

only here example this in having quinia and morphia in solution of known strength, of chalk mixture dry mixed, ready for the liquid adjuvant, of roots, seeds, barks, ready contused, etc.

Finally, in regard to finances, in that department devoted to book-keeping, to collecting your dues and paying your debts, simplicity of system, promptness, fidelity to one's own interest, exactness in dealing with others, joined to a spirit of concession and liberality in disputes, occur to me as executive means of success. General economic law governs all business, others as well as ours, and the study of how our most successful neighbors gain their ends under this law will afford many a suggestive hint of how to go and do likewise.

If at the end of life we confess to ourselves bitterly, ours to have been an unsuccessful one, let us not look abroad as the reason for it, but at home, and charge it to the absence of those natural attributes necessary in all to insure success in any walk of life.—*Proceedings Amer. Pharm. Assoc.*, 1866.

NOTE ON THE CULTURE OF SAFFRON IN PENNSYLVANIA.

By Charles A. Heinitsh.

Crocus Sativus.—Saffron, until the last few years, was cultivated in Lancaster County, Pa., to considerable extent, particularly amongst the German portion of its inhabitants, for its use as a flavoring and coloring ingredient in soups and tea, and as a domestic remedy for measles and other febrile diseases, besides making an ornamental flower-bed in their gardens.

Saffron requires a rich soil to grow it abundantly. The usual mode of cultivating it is to prepare the bed by digging deep and filling up with manure and rich soil, planting the corms or bulbs, after separating the young from the parent,* about eight inches apart in rows, (similar to onion sets,) in the month of August. Care is necessary to keep the beds free from weeds.

The flowering season commences about the middle of September, and continues until the beginning of October, according to the locality of the bed. The flowers are picked off early in the morning; the stigmas separated and dried in the shade. This

* The young corms or offshoots are attached similar to those of colchicum.

continues every day until the season ends. The leaves remain green all winter. The following June the beds are cleansed from the decayed leaves, and left until renewing time in August.

Saffron must necessarily be dear, says Mr. Bently, in an article on adulterations published in last May's number of Journal of Pharmacy, because it takes a great number of flowers to make a pound; and there are other causes, viz., failure of crops from excessive rains or drought, and attacks of the field mice, which destroy the bulbs. But withal, when we remember that all our products of the garden and farm are liable to failures from various causes, though probably not to such an extent, I think it can be profitably raised, judging from the following two calculations, taken as an average :—On inquiry from some of the growers, one informed me that about 3,000 flowers, or 9,000 stigmas, can be be raised off a bed 12×6 feet $= 72$ square feet. Another, that often in a good season between 2,000 and 3,000 flowers can be had in one morning's picking off about 500 square feet, and this continues for a number of mornings, though not always with so large a number. These two make about the average result of experienced growers.

In counting and weighing the stigmas, I find, after several trials, that 300 weigh 13 to 14 grains, which would be a yield of about 420 grains to 72 square feet, or 33 to 36 pounds to an acre. If these calculations only approximate to correctness, at present prices it will be very remunerative to the grower in comparison with many other products.

Specimens of the stigmas and corms are submitted.

Lancaster, Pa. —*Proc. Amer. Pharm. Assoc.* 1866.

ON THE INFLUENCE OF HYPODERMIC INJECTION UPON THE SCIENCE OF TOXICOLOGY.

By S. P. Duffield, Ph. D.

So wide has been the beneficial influence of improvements in chemical analysis, that it would be superfluous to attempt to make any further observations on the important part performed by this branch of the science.

When medicine, in earlier times, stepped forth and claimed preeminence and respect, while the untiring alchemist, with his

furore, furnaces and fumes, sought for that elixir which should place eternity within his control, she was then encircled by the *fancies* of her speculative philosophy, encumbering the studies of all her collateral branches.

But in the present age, the exact methods of investigation have plunged her again into a new labyrinth of untenable theories.

The famous trial of Palmer, in England, for poisoning his victim with strychnia, drew all chemists to investigate most thoroughly the behavior of this alkaloid to chemical reagents, and we now have very full data and methods which render its detection and recognition quite easy and simple.

The beautiful system of dialysis by Graham has been another step in advance, and can truly be called one of the esthetics of toxicology, divesting it, as it does, of the circuitous and very unpleasant course heretofore pursued in examining the viscera of a poisoned subject. But brilliant and rapid as have been the advances in this department of chemistry, those very discoveries have turned up new obstacles to be overcome.

Of late years, a system of introducing remedial agents into the circulation more rapidly than can be done through the agency of the stomach bids fair to place in the hands of designing persons a power which has never before been possessed by any within or without the profession of medicine. I refer to the system of hypodermic injections, becoming now so deservedly popular with the "regular medical profession."

This system owes its success to the facility with which poisons are introduced into the blood.

From the earliest times, *blood* has been a favorite topic.

Moses, in accordance with the views of the ancient Egyptians, placed the seat of life in the blood.

One might, therefore, reasonably have expected that a subject which had played such an important part in medicine would have had more than empirical supports on which to base some degree of accurate knowledge.

When we remember that only three-fourths of a century ago oxygen was unknown to the chemist, we can readily perceive why former investigators were powerless. Even to physics,

which had solved some of the great astronomical problems, the phenomena of the animal organism were a sealed book.

Albinus took no meagre view of organic activity in nature when he established the axiom that the essence of life, or the vital force, consisted in *motion*.

Changes are continually going rapidly forward in the living body; physical forces are always striving for the equilibrium; the matter set in motion by them finds its centre of gravity—its point of rest. Force is nothing more than the expression of the causal action of natural laws; and if facts do not accord with *our* laws, we have either formed false opinions, or have imperfectly investigated the different circumstances under which they were exhibited.

Within the past few years the science of toxicology, as developed by the German and French chemists, has attained an accuracy which is surprising, when we contemplate the crude state it was in fifty years ago. But rapidly as has been its progress, there has suddenly arisen a barrier to its advance, more formidable than any it had to meet before.

Friedberg and Ritter mournfully acknowledge that the day has not yet arrived when we can detect the difference between dried human and ox blood. A few enthusiasts have claimed a *peculiar odor* to different kinds of blood; but these tests stood on so slender a foundation, and required an almost *hyper-excited* nose to detect them, that no conscientious expert will, for one moment, depend on it for convicting the criminal. The microscope, with its polarizing prism, is not able to distinguish between the most of domesticated animals' blood and that of man, after it has been dried any length of time.

We are not able at the present day to detect *absorbed* alkaloidal poisons, and that is the fact forming the subject of this essay, and to which I wish most particularly to call your attention. There can be no doubt that these powerful agents, of which strychnia and morphia are the types, are absorbed into the blood, and diffused throughout the system, like other poisons. There seems to be a want of unity in the statements relative to their deposition in the viscera, and their subsequent elimination. M. Stas, in 1847, announced the discovery of the alkaloid in

the tissues; but it is questionable whether this was not some portion of the nicotina which had been *imbibed* rather than absorbed. Referring to his process, with which all analytical chemists are familiar, he says he has separated strychnia and brucia from nux vomica, veratria from extract of veratrum, emetina from extract of ipecac, colchicina from wine of colchicum, hyoscyamia from extract of henbane, and atropia from extract of belladonna. Some of the poisons mentioned here will destroy life—the fraction of a grain. Mr. Morson, of England, prepares aconitine, of which $\frac{1}{144}$ of one grain is the full dose, and says that perhaps the $\frac{1}{50}$ would prove fatal to an adult. Where is the analytical chemist who could separate, in quantity enough to give reliable color tests, and obtain crystals, visible even with the strongest microscope, this $\frac{1}{50}$ portion of a grain, after it has been thoroughly transfused through twenty-eight pounds of blood, and all the tissues and organs of the body?* He who has this power can detect, and separate, and weigh the specific poison of rabies or of the rattlesnake, and could justly be classed as a rival of Omnipotence itself.

Among numerous cases of poisoning by opium or its alkaloids which have fallen to my lot to examine and depose on, I cannot conscientiously say that I ever detected *absorbed morphia.*†

The same remark will apply equally to strychnia, and I cannot see how some men will state definitely they can separate *absorbed strychnia*, but have never dared to undertake the task; knowing that the patient dies from the poison absorbed, they, while claiming they can detect and separate *absorbed* poison, contented themselves with extracting the contents of the stomach. When we look back, we find that up to May, 1856, as regarded the detection and separation of strychnia, *chemical science was*

* Equals the $\frac{1}{9800000}$ of a grain, assuming *only* the blood contains it. If diffused through the whole body, allowing 128 pounds for the tissues, it would then be reduced to the $\frac{1}{44800000}$.

† In the case of a woman who committed suicide at one of our hotels, and whose stomach was handed me immediately after death, I was able to separate only two grains, when she had actually taken ten grains. Again, the case of a homœopathic physician, who gave solution of morphia, I detected the $\frac{1}{8}$ of a grain in a teaspoonful of the solution, and could only get a color test for morphia from the stomach.

a blank. In no one instance before this date had strychnia been obtained from the tissues of the corpse, and, in the greater number of cases, it had not even been found in its unabsorbed state in the stomach.

With respect, therefore, to the separation of the vegetable poisons from the blood and tissues, the results are very unsatisfactory. We look in vain in the treatises of Orfila, Kopp, Christison, and in the more recent works of Gaultier, Flandin, Casper, Otto of Braunschweig, and Böcker, for any instance in which they claim absorbed strychnia to have been detected either in the human being or in animals; and, in this particular, strychnia is but a type, for the same remarks hold good of the other alkaloids.

Dr. Harley, of University College, examined the blood of a dog killed by the $\frac{1}{12}$ of a grain of acetate of strychnia injected into the jugular vein. The blood, after the death of the dog, gave no evidence of strychnia. Mr. Horsely, of Cheltenham, examined the blood and tissues of a dog which he poisoned with two grains of strychnia, and could not detect its presence. Dr. De Vry, of Rotterdam, poisoned a dog with nitrate of strychnia, introduced into a wound, and, after its death, he examined four ounces of blood, but not the least trace of strychnia was detected. In another case, in which a dog was poisoned in four days by half a grain of strychnia in divided doses, the chemical analysis led to a negative conclusion, not only in the blood and tissues, *but in all* parts of the body. Dr. Crawcour, of New Orleans, gave a rabbit half a grain of strychnia; the animal died in half an hour. No trace of the poison was found in any part of the body. In a case of poisoning which occurred to Dr. Geoghegan, of Dublin, in 1856, thirty ounces of urine, which had passed the patient from the fifth to the thirty-first hour, when carefully analyzed, did not yield any trace of strychnia. A case of great bearing upon this subject occurred to Mr. Wilkins, of Newport, in the Isle of Wight, in February, 1857. A gentleman died in six hours after taking about three grains of strychnia for the purpose of self-destruction. The long period he survived was most favorable for the diffusion and deposition of the poison. The blood and heart were examined by Dr.

Taylor and Mr. Scanlan, portions of the liver and lungs were examined by Dr. Christison and Dr. Douglass Maclagan, of Edinburgh, and one kidney was examined by Dr. Geoghegan, of Dublin. The result was no trace of absorbed strychnia was detected in any one part. In reference to the detection of other alkaloids in an absorbed state, there is an absence of facts. That they enter the blood by absorption is placed beyond a doubt; but whether, when there, they are partially changed, or deposited unchanged in the organs, has not yet been satisfactorily determined by experiment. Dr. De Vry has made recently experiments on the alkaloids, and arrives at the conclusion that that part of the alkaloid which acts mortally is decomposed in the living body. The examination of a large number of cases in the human subject can alone determine perfectly this most important point in toxicology.

Be that as it may, we are absolutely certain of a failure in attempting to detect the poisonous alkaloid atropia in the blood, if administered by hypodermic injection, as it would not require more than one-half a grain to prove fatal. Analytical chemistry, which has, up to this time, occupied so prominent a position, and been so ably associated with forensic medicine, is now perfectly powerless. She cannot solve this problem. There may come a time when more accurate methods and more delicate reagents may lead us to a satisfactory solution of it. Heretofore she has been the Nemesis which pursued, with outstretched, grasping hand, the murderer. That hand has been paralyzed by this bold application of principles of chemical physiology in the treatment of disease. The only means now of detection will lie in the testimony of the physician of the symptoms observed by him at the bedside of the dying person.

Synthesis is far ahead of analysis, and we must admit that this is a problem of great importance, and to which the attention of toxicologists should be turned. For the present we must say, as we stand groping on the confines of mortality, and straining our powers to discover in the broad, measureless eternity some means of controlling the moral effect of this fact, and some law which may lead us to processes of detection, that just now we realize how helpless the human mind is, how

utterly futile has been its attempt to discover a mode of detection. In future many a throbbing heart will suddenly cease, and no eye but God's be able to detect the murderer. For the present too much weight cannot be given to the testimony of the medical witness at the bedside; if that is not had, and no physician was near at the time of death, we are cast to drift upon an unexplored and perhaps a shoreless sea.

Medical testimony now becomes all-important, and chemical testimony wanes in value, for no satisfactory results can be obtained. Juries will now, more than ever, be dependent upon circumstantial evidence.

Mortifying in the extreme as it is to our professional pride, stripped of professional honors in medico-legal investigations, the chemist and toxicologist now, if never before, realize the truth that comes floating to us on the dying breath of La Place—"What we know is little, and what we are ignorant of is immense."—*Proc. Amer. Pharm. Assoc.* 1866.

ON SOLUTION OF ACETATE OF AMMONIA.

By Wilson H. Pile, M. D.

Query 30th. What is the most perfect and reliable process of manipulation to produce liquor ammoniæ acetatis pure, and in a neutral or slightly acid condition?

This question is one which at first sight appears rather uninviting, and devoid of interest; it being a case of simple chemical union of its elements. The directions given in the Pharmacopœia for its preparation are also so concise and devoid of ambiguity, and, in chemical language, so determinate, that it might be supposed the result would always be satisfactory in a pharmaceutical point of view. And yet the contrary to this is more frequently observed. The principle is well understood—the practice is not so readily followed; and on this account probably few preparations will be found to vary more in their sensible properties than this one. Although the writer has not been able to devise any practical method by which a solution of acetate of ammonia can be prepared with perfect uniformity, and therefore so far has failed in giving a satisfactory answer to the query submitted to him, yet perhaps the observations

which he has thrown together may prove of some interest, and will be accepted instead.

The subject, then, may be considered both in a chemical and pharmaceutical point of view, and first we will briefly allude to the pure salt in solution before entering on the main inquiry.

Solution of acetate of ammonia was first described by Bœrhave, in 1732. It was also introduced into medical use by him. He prepared it in a similar manner to that followed now, by saturating the purest vinegar with carbonate of ammonia. Subsequently, Minderer, a Scotch physician, by bringing it further into notice, claimed the honor of its discovery, and the solution was hence known as "Spiritus Mindereri."

The difficulty of preparing a neutral solution, as well as the uncertainty of its strength, was early observed; and in 1773 Baumé endeavored to obtain the solid salt by concentrating the solution. In this he failed, having to encounter the difficulty of the salt being readily decomposed by heat while in a moist state,—the ammonia being first given off, and subsequently the acetic acid. Berzelius, by uniting equal weights of dry sal ammoniac and acetate of lime, and subliming by a carefully regulated temperature, obtained the dry salt by double decomposition.

In a pure state, acetate of ammonia is a white crystalline salt, easily deliquescing in a damp atmosphere. If this dry salt be dissolved in hot water to full saturation, and enclosed in flasks, upon cooling slowly the pure salt crystallizes in long acicular crystals. In this state it appears to have an acid reaction.

To prepare the solution of the salt, however, more directly, its constituents may be immediately combined:—solution of acetic acid and solution of ammonia. If these are pure and the mixture rendered perfectly neutral, the solution may be considered pure. In this state it is not a permanent salt, except in perfectly full bottles, hermetically closed. In partially full vessels at ordinary temperatures it gradually changes, the acetic acid becoming decomposed, vinegar animalcules appearing, and the solution becomes alkaline, carbonate of ammonia being thus generated.

The medicinal solution of acetate of ammonia,—liquor ammoniæ acetatis, or spirit of Mindererus,—is directed to be made, by our National Pharmacopœia, by saturating dilute acetic acid with carbonate of ammonia; and it is ordered, when dispensed, to be freshly made, the solution then containing a portion of the liberated carbonic acid gas.

In regard to the exact amount of each of the constituents to be employed in the above process, it happens unfortunately that neither of them is found in any very definite state of composition.

The sesqui-carbonate of ammonia, varying continually from exposure, absorbing carbonic acid and losing ammonia, becomes a bi-carbonate, so that only the translucent pieces in the interior of a lump have any very near approach to a definite chemical compound. The acetic acid, although permanent, is made with little uniformity, and its strength can only be ascertained by chemical tests. It follows, therefore, in carrying out the directions of the pharmacopœia, we are under the necessity of falling back on that responsible, and, to many, vague phrase, of q. s. ad saturandum. As the amount of salt in this solution depends entirely upon the strength of the acetic acid employed, apothecaries should be aware that acid of a proper strength is not readily obtained. Acetic acid No. 8, sp. gr. 1·047, is rarely met with; the article usually called No. 8 being generally only No. 6,—*i. e.*, one pint to make six of officinal dilute acetic acid. The precaution, therefore, of diluting to a lesser extent when weaker, should be strictly observed.

The acetic acid employed in this preparation should be entirely free from empyreumatic odor, derived from the pyroligneous acid, from which it is generally obtained. If free from this and other impurities, it should be diluted with pure water until its density be reduced to 1·007 at 60° F.; the ordinary No. 8 acid requiring about five times its bulk of water to dilute it sufficiently. In taking the specific gravity of liquids varying little from the density of water, particular care should be observed in reducing the temperature of the liquid to 60° F. Otto's acetometer will, however, be found a more reliable method of determining the strength of acetic acid,—the princi-

ple of which is, neutralizing the acid with a normal solution of ammonia; the quantity of the ammonia employed indicating directly the percentage of the acetic acid,—assuming that 100 grains of the officinal dilute acetic acid must saturate 7·6 grains of cryst. bi-carbonate of potassa. This will be equivalent to 4·55 per cent. of mono-hydrated acetic acid, (Wood & Bache give 5 per cent. as the strength). Acid of this percentage has a specific gravity of 1·0068 at 60° F., when accurately taken.

Having the acetic acid properly diluted, the directions of the Pharmacopœia are to add the carb. ammonia gradually to the acid, until this is saturated. It is just here that a practical difficulty occurs, in determining the exact point of saturation. At first the taste will sufficiently indicate if the solution is yet acid, but as the point of saturation is approached, litmus paper or solution of litmus must be resorted to. These, if proper precautions are taken, will give sufficiently accurate results. It will be observed, in testing liquids containing free carbonic acid, that litmus will be reddened, even after the solution is neutralized by an alkali. This reddening, however, is not permanent, but will disappear upon drying the paper, the carbonic acid going off with the moisture. This source of fallacy may also be overcome by gently warming a portion—say half an ounce—of the solution, to which a few drops of the solution of litmus has been added. The red color of the solution will gradually change to a violet, indicating the fact of its alkalinity. If now dilute acetic acid be dropped in until the color is slightly reddened, the number of drops required will give the proportionate amount of acid to be added to the remainder of the solution. If, on the contrary, the solution when heated should remain red, aqua ammoniæ should be dropped in until the color just begins to change, the number of drops indicating, as before, the amount requisite for the whole solution.

It has been proposed, in order to avoid in a measure the uncertainty above alluded to, to saturate the strong acid No. 8 directly with carbonate of ammonia, and afterwards to dilute to the proper degree.

Made in this manner, there is much less difficulty in ascertaining the point of saturation, no carbonic acid being retained in the solution.

The German and British Pharmacopœias order the liquor ammoniæ acetatis to be made by the union of strong acetic acid and concentrated aqua ammoniæ; the former adding water to the neutral solution until its density becomes 1·035. The British Pharmacopœia employs it undiluted, of specific gravity 1·060; made in this way, the solution is nearly four times the strength of our own. It is also much less liable to decomposition, and no difficulty occurs in preparing it neutral, there being no carbonic acid in the solution. In commenting upon this process, Prof. Bache, alluding to the absence of the carbonic acid in the solution, says, that "a great benefit remedially is gained by its presence, which reconciles the stomach to the medicine, and sometimes even allays vomiting in febrile diseases." With this view of the subject, and believing that the remedial efficacy of a medicine should always be esteemed of the highest importance, and, in fact, as constituting its only value, I suggest the following method of preparing the liquor ammoniæ acetatis; a modification of the officinal directions, yet following strictly its spirit.

A solution of the translucent internal portion of sesqui-carbonate of ammonia is to be made according to the following data:

The pharmacopœia gives 7·6 grains bi-carbonate of potassa as the quantity necessary to saturate 100 grains of dilute acetic acid, or nearly 34·9 grains per fluidounce. As the equivalent saturating powers of bi-carbonate of potassa and sesqui-carbonate of ammonia are respectively 100·2 and 59, it would therefore require 20 grains of this latter to saturate one fluidounce of dilute acetic acid. The solution of ammonia I make of double this strength, or 20 grains to half an ounce of distilled water,—the other half-ounce requiring to be made up of a dilute acetic acid of double the officinal strength. It is in preparing this acid solution of proper strength, that the only practical difficulty lies. The method I have taken is the following: from a pipette graduated into 100 parts and filled with No. 8 acetic acid, I drop sufficient of the acid to neutralize 100 similar parts of the prepared ammoniacal solution. The quantity requisite is noted, and that amount of acid must consequently

be made to measure 100 parts, by the addition of sufficient water. Thus, if 30 parts of acid were necessary to saturate 100 parts of the ammoniacal solution, then to every 30 parts of acid add 70 parts of water, and the solution is ready for use. The solutions keep well, and it is only necessary to mix them in equal quantities to produce an effervescent draught of neutral acetate of ammonia, retaining the free carbonic acid so desirable as a remedial agent.—*Proc. Amer. Pharm. Assoc.*, 1866.

ON AMERICAN OPIUM.

By Israel J. Graham.

At the meeting of the Association last year, (1865), specimens of "Virginia Opium" were presented for examination by W. H. Schieffelin & Co., of New York. At the request of the Association I accepted these specimens for the purpose of a morphiometrical analysis, as upon the proportion of opium's most important alkaloid—morphia—that any specimen shall contain, should the medicinal value of the drug alone be estimated. The quantity of this, therefore, together with that of narcotina, have been the principal objects of my investigations.

Before proceeding with a statement of my experiments, I would remark that these specimens of opium, one made in 1864 and the other in 1865, were manufactured by Powhatan Robertson, Campbell Co., Virginia, from the capsules of several varieties of poppies grown by himself, as will be seen from the following extracts from a letter on the subject received from him by W. H. Schieffelin & Co.:

"The Virginia Opium was made from poppies of almost every variety—the single variety, however, with purple spots on the petals, predominating. This variety of poppy seems to yield more opium than the double, and its seed capsules are of a shape that makes the collection of the opium less troublesome."

"The capsules should be incised longitudinally about three or four days after the flower has dropped. The incisions may be repeated several times on the same capsule; they should be made in the evening and the opium scraped off next morning.

There was no bad effect observed by the person who collected

this opium, but there was only a small quantity made, not more than eight or ten ounces, and not more than one hour's time was occupied every morning for about three weeks."

"I can form no reliable opinion as to how much an acre would yield, from the fact that only a small piece of very rich land (formerly an asparagus bed) was used, and the poppies did not come up at all regularly, nor was all the opium made that might have been."

"The seed should be drilled in rich land, in August or September, leaving room for a person to pass between the rows, and the plants to be thinned out in the spring so as to stand about eighteen inches or two feet apart." * * * *

In relation to my experiments, I have to regret at the outset that I had not in the first instance more fully considered my subject, and divided the small amount of material at hand into several portions, with a view of not only repeating the process used, for the extraction of the two important alkaloids referred to, with certain modifications, so as more correctly to ascertain the true percentage of these, but also for the purpose of ascertaining the relative proportion of these yielded by each year's product; the quantity of soluble matter yielded by each to different menstrua, and other minor points of interest in connection with the investigation of a substance of so much importance as opium produced under the circumstances of these specimens.

It was not, however, until after I had nearly completed my experiments that I took this view of the subject, which was then too late for my purpose, having already submitted the quantity I received to the two processes about to be described.

The opium in question presented physically the appearance of a good article as compared with the best varieties of the imported drug, not, however, possessing the characteristic odor in so marked a degree. I would here observe that the sample of opium marked as being made in 1864, possessed not only the peculiar smell of opium in a higher degree than the sample made in 1865, but also a nearer approach in color to that most highly esteemed in the foreign drug.

One of the specimens being received in the form of powder, I dried the other and likewise pulverized it, and thoroughly mixed

the two portions. Of this uniform powder 300 grains were incorporated with less than half of its weight of prepared sawdust* to facilitate percolation, then arranged in a suitable displacer dry, moderately pressed, and treated with cold water until the droppings passed colorless and almost tasteless. The percolate, which was a very dark, rich colored liquid, possessing a strongly bitter taste, was then concentrated by evaporation, treated with ether to remove the narcotina, and the ether separated by a suitable funnel. The liquid, thus deprived of narcotina, after being mixed with a due proportion of water and heated to expel the combined ether, was then mixed, first, with nearly an equal bulk of alcohol, and then with solution of ammonia combined with alcohol, in the manner directed by the Pharmacopœia in the preparation of morphia. The result was, greatly to my disappointment, a very moderate crop of slightly colored crystals of morphia, very little exceeding one per cent. of the opium employed.

The smallness of this result cannot be due to any incompleteness in the exhaustion of the opium, as this was most thorough, nor am I now prepared to decide the true cause which I propose to leave for future investigation. The ethereal solution above alluded to, on the evaporation of the ether by exposure in a beaker glass, yielded beautiful crystals of narcotina mixed with some impurities, weighing in all nearly 10 grains. In the meantime the residual opium from the aqueous exhaustion was then treated with dilute acetic acid, which produced a light wine-colored solution, to which ammonia was added to precipitate any narcotina thus taken up. The precipitate, after being washed with water, was treated with boiling alcohol. This solution, upon cooling and evaporation, yielded a very small quantity of narcotina. The whole amount obtained, both from the ethereal treatment of the aqueous solution and the acidulous treatment of the marc, not exceeding 3·5 per cent.

From this experiment it will be observed that the larger quantity of narcotina was taken up by the aqueous treatment.

The remainder of my supply of the opium (150 grains) was then digested in ether until everything soluble therein was sup-

* Sawdust from pine, exhausted of all matter soluble in alcohol and boiling water.

posed to be taken up; this etherial solution, exposed for evaporation, yielded what appeared to be a fair proportion of narcotina in handsome crystals associated with resinous matter.

In a subsequent treatment, to separate the narcotina from this resinous matter, an unfortunate accident occurred to the vessel containing it which occasioned the loss of all. The proportion, therefore, of narcotina contained in this portion was not determined and consequently not so accurate a percentage of its yield by the specimens of opium was arrived at as would be desirable.

After the exhaustion by ether, the opium was digested in water until everything soluble in this menstruum was taken up. The aqueous solution was then mixed, as in the previous case, first with alcohol and then with ammonia, and put aside for the proper length of time that crystals of morphia might form, which, upon being removed, weighed 5½ grains, or very nearly four per cent. If we make allowance for some loss sustained in manipulation, first of the opium itself, and then of the morphia, we may conclude that the yield in this case was four per cent. of morphia. The morphia in both cases was comparatively light colored and the crystals of narcotina were very beautiful and still lighter colored. I did not attempt the purification of either, owing to the smallness of the quantity obtained. As before observed, I would have been glad if my supply of material had enabled me to ascertain comparative morphiometrical and other results, by treatment with cold and hot water, acidulous and alcoholic menstrua.

From these experiments it would appear, then, that the specimen of Virginia opium exhibited to the Association contained four per cent. of morphia and 3·5 per cent. (approximately) of narcotina.

It becomes a matter of interesting inquiry to ascertain how far the results, in the production of this opium, would be modified by a particular mode of culture, and the character of soil and season, as it is altogether probable that its morphia-yielding quality is in a great measure dependent upon a combination of these circumstances.—*Proc. Amer. Pharm. Assoc.*, 1866.

ON THE PART PLAYED BY CHALK IN BUTYRIC AND LACTIC FERMENTATION, AND THE LIVING ORGANISMS IT CONTAINS.

By M. A. Bechamp.

During my study of fermentation, it occurred to me to inquire whether the only part played by chalk in the phenomena called butyric or lactic fermentation, is that of maintaining the neutrality of the medium—that is to say, of acting exclusively as carbonate of lime.

White chalk, which belongs to the upper part of the cretaceous stratum, seems to be formed, for the most part, from an extinct microscopic world. According to M. Ehrenberg, these fossil remains are of small organized beings of two families, which he names *Polythalamies* and *Nautilites*. These creatures, formerly organized, are so small and so numerous that a morsel weighing 100 grammes may contain 2,000,000 of them.

But independently of these extinct creatures, white chalk still contains a generation of organisms much more minute than any hitherto known, more minute than any of the infusoria or microphytes of fermentations; and they are not only present, but they are living and adult, though no doubt very old. They act with great energy as ferments (I purposely use this common phrase), and, in the present state of our knowledge, they are the most powerful I know, inasmuch as they are nourished on the most varied organic substances, as I will endeavor to show in a future memoir.

Take from the centre of a block of chalk, either recently taken from the quarry, or after it has been for some time extracted, a portion of the substance, no matter of what size (so that the results may not be supposed to be affected by atmospheric dusts); crush this, mix it with pure distilled water, and put under the microscope with the magnifying power of Nachet's No. 7 eye-piece No. 2 object-glass, and the field will be covered with brilliant points, often very numerous, shaken by a quick trembling movement.

It is generally said that they are animated by a *Brownian* movement. Not believing that this movement belonged to the molecules, and regarding them as living organisms, the smallest I had ever observed, I had recourse to two kinds of proofs to

resolve the problem involved in this hypothesis. The first consists in showing these molecules to be ferments, the second in isolating and analysing them,—that is to say, showing them to contain carbon, hydrogen, and nitrogen in the organic state.

I. *Chalk without the addition of albuminoid matter acts as a ferment.* For all these experiments chalk from the centre of the block is used.

a. The action of chalk on starch.—Mix thoroughly 420 grammes of starch paste containing 20 grammes of starch, 30 grammes of chalk from the centre of the block, and 4 drops of creosote. Prepare at the same time a similar mixture in which pure carbonate of lime, recently prepared and exposed for forty-eight hours to the action of the air, is substituted for chalk. The next day the two mixtures will appear to be in the same state. The day after, the mixture containing the chalk will begin to liquefy, and the following day will become perfectly liquid, whilst the other, containing carbonate of lime, will not have changed. The soluble portions of the liquified starch contain soluble fecula and traces of dextrine.

On November 14th, 1864, 100 grammes of starch in the form of paste were placed in 1500 cubic centimetres of water, 100 grammes of Sens chalk, and 10 drops of creosote. The starch was found to liquefy as above, and soon carbonic acid and hydrogen were disengaged. On March 30, 1866, the product of the reaction was analysed, the result being—

Absolute alcohol,	4 c. c.
Butyric acid,	8·0 gr.
Crystallized acetate of soda,	5·2 "

In another experiment, besides these products, a notable quantity of lactate of lime was obtained.

b. The action of chalk on cane-sugar.—On April 25, 1865, 80 grammes of very white cane sugar, 1400 grammes of chalk, and 1500 cubic centimetres of creosoted water were placed together. On June 14th the product was analysed, with the following result:

Absolute alcohol,	2·6 c. c.
Butyric acid,	4·5 gr.
Crystallized acetate of soda,	6·8 "
Crystallized lactate of lime,	9·0 "

I have verified these results, and found them always the same. I must add that, under the same conditions, pure carbonate of lime has no action, provided all contact with air be avoided; but there are cases in which creosote does not prevent these mixtures fermenting, which would make it appear that there are in the air adult organisms capable of existing in a creosotic medium containing lime.

I will add two observations: the first is, that, to prevent chalk from acting either on cane-sugar or starch, it should be moistened and heated to about 300°; the second is, that, if sufficient precautions be taken, there will be found, after fermentation, no other ferment than that observed in the chalk, though this will have augmented.

II. *Chalk contains carbon, hydrogen, and nitrogen in the state of organic matter.*—If the preceding experiments be really conclusive, organic matter ought to be found in chalk. To demonstrate this, I have submitted to organic analysis the insoluble part left by chalk when treated by dilute acids.

Dissolve an unpulverized block of chalk in weak hydrochloric acid. Collect the undissolved portions on strong and smooth paper, and wash them in acidulated water until no lime is detected in the filtrate. Then remove the moist residue with a card, without injuring the filter; spread it thinly on a sheet of glass, and let it dry screened from dust.

100 grammes of chalk will thus give 1·15 gr. of insoluble portions dried at 100°. By then drying at about 160°, and incinerating, it will be found that 100 parts of residue dried at 100° are formed of—

	Per ct.
Water (lost at 100° to 160°), . . .	2·47
Organic matter (lost by incineration,	7·17
Mineral matter (residue), . . .	90·36
	100·00

Submitted to organic analysis, the residue dried at 100° furnished the following results:

Carbon, ...	1·053
Hydrogen, ...	0·740
Nitrogen, ...	0·128

The nitrogen was estimated by Will and Varrentrapp's process. It was ascertained by a trial experiment that the sugar and soda lime employed produced no appreciable quantity of ammonia.

Is white chalk the only form of carbonate of lime which contains actually developed ferments? To resolve this question, I had recourse to M. Michel, who supplied me with a block of limestone of Pountil. This limestone behaved in exactly the same way as white chalk—in short, with chalk only (without any other albuminoid matter than that contained in the starch granules and the trace which may be supposed to exist in cane-sugar), cane-sugar and fecula starch may be fermented, and produce, besides alcohol, the characteristic limits of lactic and butyric fermentations.

The name I propose for the small chalk ferments is "Microzyma cretæ." I believe this to be the first example of a class of organisms which I shall have the honor of laying before the Academy. The microzyma are to be found in many directions; they accompany various other ferments; they exist in certain mineral waters, in cultivated earth, where they no doubt play an important part, and I believe that a great number of molecules, considered as mineral, and animated by a Brownian movement, are no other than microzyma. Such are the deposits of old wines, of which I have treated in a former paper, and the deposits already described by Cagniard-Latour, and which he finally considered as inert matter.—*Chem. News*, Oct. 19, 1866, from *Comptes Rendus*, lxiii. 451.

NOTE ON THE CULTIVATION AND PREPARATION OF CASTOR OIL IN ITALY.

By H. Groves, Florence.

Two species, or more probably varieties, of *Ricinus*, are found growing spontaneously in the kingdom of Italy—*R. communis* and *R. africanus*—the distinction being chiefly in the stigmata, of which the former has three deeply-forked, and the latter six.

I have not been able to learn at what epoch these plants were introduced, but it would seem probable, from the early use

of castor oil, that they have figured amongst Italian, or at least Sicilian plants, from a remote period, choosing their habitat in the moist thickets that abound near the southern coasts.

The cultivation of castor oil plants for the purpose of commerce, and especially for export trade, has a comparatively recent date, and the introduction of one of the most esteemed varieties dates back but twelve years.

Although the cultivation is carried on in nearly every province in the kingdom of Italy, as well as the Papal States, it is chiefly from the province of Verona that we draw our supplies, both of seed and oil. There are other large manufactories at Leghorn, Genoa, etc., but both there and in the Veronese territory it is frequently found necessary to purchase foreign seed to make up for the scarcity of the native supply, which is regulated in great measure by the value of maize and sagina—plants preferring the same soil as that required by the *Ricinus*.

The two principal varieties cultivated south of Veropa are the black-seeded, or Egyptian, and the red-seeded, or American. The latter yields a greater percentage of oil than the former, but the oil is not so pale in color. The Egyptian variety differs also in requiring a rich soil, whereas the American plant prefers a dry soil with plenty of sun.

Speaking generally, the land best adapted for the cultivation of the castor oil plant should not be too argillaceous, but friable, and well exposed to the sun. In November the ground is ploughed up and allowed to remain all the winter exposed to the frosts and north winds, which are frequently severe. By this means the soil is well broken up, and in the spring a series of deep furrows are made about five feet apart for rich soils, or four feet for ground of a less fertile nature. In these furrows are deposited beds of stable manure, which are lightly covered up by means of a plough. In May, or before, according to the precocity of the season, the soil in the furrow is well mixed, and the couch grass and other weeds having been uprooted, planting is commenced. The seed, which is carefully selected, is held in the aprons worn by the women, who take up three or four grains between the thumb and two fingers, and thrust them into the middle of the furrow, dexterously earthing up the hole in the

withdrawal of the fingers. The distance between the plants should be about 3½ feet. After fifteen or twenty days the young plants will have sprung up to a height of about two inches, and the women again visit the fields for the purpose of selecting the strongest plants in each bunch, destroying the others and earthing up the chosen one. After another fifteen days, the plants having attained a height of about eight inches, a plough usually drawn by two oxen is passed between them, to turn more soil into the furrows, and the women following, earth up the plants, leaving only the leaves uncovered. Later, the "*incalzation*," as it is called, is repeated with the spade, and the plants being now sufficiently strong, are left to themselves.

The seeds begin to ripen early in September, when women with baskets on their arms make a daily gathering of the ripe grains, passing by each plant every two, three or more days, according to the intensity of the heat. As soon as gathered, the seeds are spread out on an open floor, to insure their being dry, and, as they retain the outer covering, are called "*Ricino investito.*" To obtain the seeds as they are met with in commerce, the following means are adopted:—A layer of about two inches of "*Ricino investito*" is spread over the wooden floor of the barn, and a man without shoes takes an implement made of a flat piece of wood about twenty inches square, underneath which is attached a layer of cork about two inches in thickness, fitted with a handle springing at right angles from the wood, so that it may be used by the man standing. This implement is pushed backwards and forwards, running gently over the seeds, so as to break up the integument, which is subsequently winnowed away. The seed with double covering yields about 66 per cent. of the commercial article.

As soon as the gathering of the seed is over, the plants are cut down and tied in bundles, which are left out to dry, and used in the winter for fuel. The winnowed integument is also used for burning in stoves, or for mixing with stable manure for vine dressing. Finally, when the land is ploughed up in November, the roots are collected, dried, and used for burning. A certain oleaginous principle appears to pervade the whole plant, rendering it useful as a heat-giving and brilliant combustible.

The height of the Ricinus varies from five to ten feet, according to the soil, so that the husbandmen have to take into consideration its probable growth, in order to allow a sufficient space for the development of the branches. It is calculated that the Veronese territory alone yields an annual produce of over five million kilogrammes of seed, being less than the quantity required by the manufacturers, who are thus obliged to use a portion of foreign seed.

The preparation of the oil is conducted with great care, so that even the last integument is removed before the seed is subjected to pressure. For this purpose, the grains are passed through a machine consisting of two large revolving wooden rollers, beneath which is placed a powerful winnowing machine for the separation of the seed from the covering, now become broken by the action of the cylinders. As a further guarantee, a number of little girls are employed as sorters, and for this purpose are usually seated, when, placing the seed before them by small quantities, they reject those from which the seed-coat has been imperfectly removed, as well as the damaged and rancid grains, throwing the good ones into baskets placed beneath.

Every manufactory of any importance has at least five or six hydraulic presses, which are placed in a room heated in winter to a temperature of about 70° Fahr. Strong coarse hempen press-bags, about fourteen inches wide, are always kept ready, and in each is placed about three kilogrammes of cleaned seed. The bag, being longer than wide, folds over when in the press, and between it and the superposed one is placed a sheet of iron that has been heated to about 90° Fahr. The presses usually contain from twenty to thirty bags, which have a thickness of rather less than two inches each. All the oil which flows from this pressure is of the first quality. The marc is now ground in a mill, and again placed in the bags; the sheet iron, as usual, is placed between each layer, and the whole gently heated up to about 100 Fahr., when it is again subjected to pressure, the result of which is a further yield of straw-colored oil, much used in the manufacture of printer's ink, etc., etc. The blanched seeds sometimes yield a total of 40 per cent. of oil. The first quality is kept in a warm place, (in summer just beneath the roof,) for some days, and deposits a quantity of mucilaginous and fatty

matter, after which it is filtered. The filtering bags are made of a cloth found in commerce, and have a capacity of seven kilogrammes of oil. When filled, the mouths of these bags being tied up, they are placed on the tin-lined shelves, disposed in such a manner round a room that, by the aid of tubes, the filtered oil flows from all sides into the vessel placed to receive it. Each room usually contains about 2,000 kilogrammes of oil, the temperature being kept at about 55° Fahr. The exhausted marc is used as a manure for hemp and flax, for which purpose it is supposed to be well adapted.

Some little while ago it was proposed to use the marc as a cosmetic in the same way as we employ almond meal, but it did not answer this purpose, as it was found to possess considerable irritant properties. Might not these qualities render it a useful counter-irritant applied as cataplasma? As the marc is readily obtainable in England, it would be as well if some one were to report on its therapeutical value.

Complaints have been made of the difference of quality in Italian castor oils, and of the tendency in some samples to deposit fatty granules in cold weather; but the oil prepared according to the method just described, which is that employed in the Veronese territory, cannot be surpassed in taste or appearance, and gives little or no deposit in the ordinary temperatures of winter. The deposit complained of is due to greater heat having been employed in the processes of pressure and filtration.

From the large doses of the oil used in Italy—sometimes two ounces, simple or mixed with almond oil—it would seem that the comparative tastelessness and brilliancy of the oil are acquired at the expense of its purgative power. I have heard or read that the Chinese use castor oil in their salads. Surely it can possess but feebly the purgative qualities of other castor oils, leading one to suppose that climatic influences and mode of cultivation oppose the development of the purgative principle, which is still further lessened in the oil by a careful preparation. It is probable that to some such causes we must attribute the peculiar blandness of true Italian castor oil.

I am indebted to Signor Valeri for much of the information in the foregoing paper.—*Lond. Pharm. Journ., October*, 1866.

Florence, August, 1866.

MUDAR, A SUBSTITUTE FOR IPECACUANHA IN THE TREATMENT OF DYSENTERY.

Mr. J. J. Durant states (*Indian Med. Gazette*, May, 1866), that he has found the powder of the bark of the root of mudar (*Calotropis gigantea*) an excellent substitute for ipecacuanha in the treatment of dysentery amongst the native population. In every acute case in which he prescribed mudar it either effected a complete cure in a few days, or at once changed the character of the disease from bloody and mucous to bilious diarrhœa. He administers it in similar doses to what are usually given of ipecacuanna, never beginning with less than one scruple, and seldom going beyond one drachm. He usually gives it alone, but when a weak stomach is suspected in the patient he combines it with carbonate of soda, creasote, bismuth, prussic acid, &c. Like ipecacuanha, mudar, in large doses, is a reliable cholagogue; it is also a sedative to the muscular fibres of the intestines, particularly of the rectum and colon, rapidly allaying all pain, tenesmus, and irritation, and putting a stop to dysenteric action. Its most marked effect is the production of a copious flow of bile, which follows its use in about twenty-four hours.—*Amer. Journ. Med. Sci.*, Oct., 1866.

AMBLYOPIA PRODUCED BY OSMIC ACID.

Dr. Henry D. Noyes records (*New York Medical Journal*, July, 1866,) the following case of this:—

"In June, 1863, Dr. P., assistant in a chemical laboratory, came into my office, stating that he had been suddenly made blind in the left eye in the following manner: He was heating in a crucible a compound of iridium and osmium. He took out a piece of the metal with a pair of forceps for closer inspection, and, though aware of the poisonous properties of the fumes, incautiously held it near the left eye. Immediately struck with a sharp pain, he shut the eye and drew back. In ten minutes he came into my office. The lids were spasmodically closed, light very distressing, and pain in the globe severe. The conjunctiva and sclera were intensely injected, and lachrymation profuse. Pupil of natural size and activity. Sight dim, viz.,

$\frac{1}{3}$, and reads only No. 3, of Jaëger at ten inches. All objects look dim. This dimness is not the effect of lachrymation, because wiping away the tears does not better the vision. Accommodation perfect. There are no muscæ nor phosphenes; the visual field normal. By the opthalmoscope, both the inverted and upright image, no material change discovered. The media clear, the optic nerve pink, but not unlike the other eye.

"The external inflammatory symptoms continued for one day, and then the eye resumed its normal condition, both in appearance and function.

Dr. P. informed me that a similar accident had once before occurred to him, and that he had seen an account of such an occurrence to a Russian chemist.

The impaired sight was not the effect of the irritation of the conjunctiva, because an equal degree may be excited by the presence of a foreign particle, without any amblyopia. Dr. P. and myself were both convinced that a peculiar poisonous influence was exerted on the retina, produced in a marvellously short time, by the simple contact, for only an instant of the irritating fumes of osmic acid with the surface of the globe.—*Am. Journ. Med. Sci., October*, 1866.

ON BENZOINATED LARD.

By Thomas Dolliber.

Query 25th. What is the best process of benzoinating lard and simple ointments? Can benzoinated lard be employed for mercurial ointment, so as to prevent its strong tendency to become rancid, without hurting its medical qualities; and in what other ointments may this form of lard be advantageously used?

In order to ascertain the best process of benzoinating lard, the following experiments were tried:

Two troy-ounces of benzoin were digested with 32 troy-ounces of lard in a water-bath, in accordance with the formula of the Pharmacopœia for preparing ointment of benzoin. The residue of the benzoin, after being dried at a very moderate heat between folds of bibulous paper, was found to weigh one troy-ounce and 306 grains. There had been abstracted from it 174 grains by the lard, provided there were no loss by evaporation or by the sub-

sequent drying. The benzoin, after l ng digested in the lard, appeared to be unaltered in its sensible properties.

One troy-ounce of benzoin was macerated in four fluid-ounces of alcohol, which dissolved 406 grains. The residue had no odor of benzoin, and on being digested with lard yielded no perceptible odor or color to that substance. It was thus proved that lard will not dissolve any portion or principle from benzoin that alcohol will not also dissolve. It was also proved, by repeated trials, that 16 troy-ounces of lard will not dissolve and retain more than 90 grains of benzoin by the process of the Pharmacopœia for ointment of benzoin.

After several trials the following formula was adopted as the best one for benzoinating lard :

Benzoinated Lard.

Take of Tincture of Benzoin four fluid-drachms.
Lard, 16 troy-ounces.

Rub them together until they are thoroughly mixed; then melt the mixture by a gentle heat and stir the product constantly while cooling.

Tincture of Benzoin.

Take of Benzoin, in coarse powder, six troy-ounces.
Alcohol, one pint.

Macerate the benzoin with the alcohol until it is dissolved; then filter through paper.

The benzoinated lard made by this process is beautifully white and smooth, with the odor of benzoin well marked; while the officinal ointment of benzoin is almost always dirty white in color, and granular from long digestion in the water-bath, and if heated over a direct fire the benzoin is precipitated upon the inside of the vessel; which precipitate cannot be re-dissolved by heating; while the benzoinated lard prepared by the above formula can be heated to 200° without precipitating the benzoin, and consequently can be used in the preparation of any of the ointments of the Pharmacopœia.

Three portions of mercurial ointment were made. The first was prepared strictly according to the formula of the Pharmacopœia. In the second, ointment of benzoin was substituted for lard. In the third, benzoinated lard was substituted. These

three portions, covered lightly with paper to prevent accession of dust, were exposed to the air at the ordinary temperature. Two were made in January, and one in June last: but as neither portion has yet become rancid, I cannot definitely answer the second clause of the query.

Three portions of ointment of red oxide of mercury were also made: the first with lard, the second with ointment of benzoin, and the third with benzoinated lard. The three portions when made were of the same pink color and perfectly smooth; they were made on the 20th of June, and were exposed in the same manner as the mercurial ointment for nearly two months; at the end of which time they were found in the following condition:

The first, made with lard, had changed in color to dark green, had separated into a granular and a semi-fluid substance, and had become very rancid. The second, made with ointment of benzoin, had not changed color nor become rancid, but had separated in the same manner as the first. The third, made with benzoinated lard, was entirely unchanged in odor or appearance, and looked precisely as if just made.

Experiments with other ointments have not been tried, but there is no doubt that the benzoinated lard can be used in many of the ointments of the Pharmacopœia, without affecting their medicinal qualities.

BOSTON, August, 1866. —*Proc. Am. Pharm. Ass.* 1866.

ON GRANULAR EFFERVESCENT CITRATE OF MAGNESIA.

BY JAMES W. MILL.

QUERY 19. What is the best formula for a granular effervescent Citrate of Magnesia, which shall be permanent, readily soluble in water and suitable for general use?

Soluble citrate of magnesia, in a granular form, is most conveniently obtained according to the writer's experiments by the process of M. de Letter, detailed in the Am. Jour. Pharm., July, 1863, page 312. To succeed well the ingredients should be intimately mixed and exposed in a warm, rather moist situation. The reaction is completed within a few days, and the resulting citrate, by simple trituration in a mortar and sifting, is readily obtained in a granular condition.

An effervescent citrate may be made according to the following formula:

Take of Citric acid, ʒvij.
Carb. magnesia, ʒiij.

Mix intimately and expose in a warm, moist atmosphere till all reaction has ceased. Dry, and by trituration and sifting reduce to a granular powder, then take of this

Acid cit. magnesia, one troyounce.
Granulated sugar, half "
(Flavored with oil of lemon.)

Bicarb. soda (dried at a heat under 212°) 100 grs. Mix.

The granulated form of this preparation is handsomer in appearance and probably more permanent, but the powdered is to be preferred, nevertheless, on account chiefly of its readier solubility. The writer has tried the process of M. Morelli, published in the last number of our Journal of Pharmacy, (July No., 1866,) and finds it to yield a salt of readier solubility than any he has yet tried. The following formula is based on this process:

Take of Citric Acid, ʒvij.
Carb. magnesia, ʒiij.
Water fʒiiss.

Pulverize the citric acid, add the water and then incorporate the carb. magnesia. The mass should be stirred frequently during the reaction; when dried and pulverized, add to each troyounce

Pulv. sugar (flavored with oil of lemon,) ℥ss.
Bicarb. soda (dry,) 100 grs. Mix.

Chicago, Ill., 1866. —*Proc. Am. Pharm. Ass.* 1866.

REMOVAL OF NITRIC ACID FROM SULPHURIC ACID BY CHARCOAL.

By William Skey, Analyst to the Geological Survey, New Zealand.

In certain analytical operations, also for voltaic batteries, it is sometimes necessary to use sulphuric acid which is uncontaminated with nitric acid; but their separation hitherto has been a matter of difficulty, only attained by methods of a very protracted nature.

In the case of dilute sulphuric acid, however, this can be effected by shaking it up with a little freshly-burned charcoal in a state of powder for a few minutes, and afterwards filtering.

Sulphuric acid which has passed through this operation does not give any reaction of nitric acid when left in contact with crystallized sulphate of iron, although before the action may have been very decided.

But if concentrated sulphuric acid, which is only very slightly admixed with nitric acid, be taken and agitated with charcoal as before, it will be found, even after a very long contact, that a crystal of sulphate of iron immersed in it is turned of a pink color just as quickly as if charcoal had not been used.

This refusal of charcoal to absorb nitric acid from its solution in concentrated sulphuric acid would seem to indicate that this acid is retained by the charcoal, in the first instance, in the form of a hydrate, the dilute condition of the sulphuric acid employed preventing its decomposition.—*Lond. Chem. News, November* 9, 1866.

ON THE USE OF SPIDER'S WEB AS A STYPTIC.

By Abr. Robertson, Wheeling, Va.

On one or two former occasions I have written something on the use of the spider's web as a styptic in cases of excessive hemorrhage after extracting a tooth. I now wish to add the result of my experience in another case. I do it with the hope and belief that it may be an essential service to some of my professional brethren, and perhaps to some of their patients. It may be thus serviceable on two accounts. First, it can always be obtained, and everywhere, and sometimes when other more popular remedies cannot so readily be obtained; and second, because in my hands it has proved efficient where everything else has failed.

About a year ago a young man, about eighteen years of age, came to my office to have a lower molar tooth extracted. I examined the tooth, took my forceps and extracted. The operation required rather less force than usual. The tooth came out entire, and clean, and with no laceration of surrounding parts, except

the necessary severing of the periosteum. But from the first, blood flowed more freely than usual. I directed my patient to rinse his mouth with cold water, which he did considerably longer than the usual time of the flow of blood in such cases, but with no diminution of its flow. I then applied tannin on pledgets of moistened cotton, filling the socket with them. After repeating this application two or three times, the bleeding ceased, and he left. In about three hours after, he returned, bleeding as profusely as ever. I then filled the socket from whence the tooth came with cotton saturated with perchloride of iron. This I repeated several times, with a delay of a few minutes between the applications, without any apparent effect. I next applied the persulphate of iron, full strength, in the same manner, and with no better result. Finally, I procured some spider's web, with which I filled the socket, as I had before done with the cotton, when—I need not say that I was gratified to see—the bleeding stopped almost immediately, and there was no more recurrence of it.—*Dental Cosmos, November*, 1866.

PILULÆ METALORUM ET AMARUM.

By Humphrey Peake, M. D., of Visalia, California,
Formerly of Yazoo City, Mississippi.

I propose in this paper to make known to my professional *confreres* the formula for a pill which I have been using for the past ten years, and with such success as never to have been disappointed in the main object—that of improving the quality of the blood. In plain English, I call it a blood maker; in the language of the profession, a hæmatic; of the class Hæmatica, of Dr. Headland. I have named it "Pilulæ Metalorum et Amarum"—pills of the bitters and metals—for a reason that any doctor may readily see. Its formula is as follows:—

℞. Quiniæ sulphatis, ʒj.
Ferri Redacti, ʒjss.
Strychniæ.
Acidi Arseniosi, aa grs. iij.
Confectionis Rosarum.
Vel Mucilaginis Acaciæ.
q. s. ut ft. pil. lx.

The range of morbid conditions to which this pill is applicable is astonishing to any but the educated of the medical profession. It is applicable to all cases—saving, perhaps, organic disease of important organs, and here, indeed, it could do no harm, although it might be impossible to cure—when the object is to improve the quality of the blood. But it is more particularly applicable, and useful, and *curative*, in the whole list of what I will take the liberty of calling *malarial cachexiæ*. My native country, and that of my early study and practice, is one bathed in malarial poison, and through which flow the Ouachita of Arkansas, and the Red River, dividing the latter State from Texas.

I do not believe that the composition of this pill is to be found in any book. The manner in which I was led to its combination was natural enough, and the only wonder is that the combination had not been made before.

It was and is a very easy matter to stop the paroxysms of a quotidian, tertian or quartan ague, but in a good many cases the paroxysms return at the end of one, two or three weeks, and in some cases, at the end of four weeks—the latter giving rise, doubtless, to the designation *mensæ* in the older writers. They were known among the people as one, two and three weeks' "chills." My father being a physician, I necessarily saw much of the treatment of these maladies, according to the ideas and teachings of the time. When a tyro in medicine and a commencing practitioner, they continually met me, and were among the opprobria medicorum.

I reasoned thus: Sulphate of quinia is an excellent remedy for the ague. Its great value is unquestionable. So is and was that of the Jesuits' bark, from which quinine is made. Iron, also, is good in chronic ague, and enters into many or most prescriptions for its cure. So, too, of arsenious acid. Its reputation is older than that of the bark, or of quinine, and it is still resorted to when the latter fails. Late investigations, too, have shown that *all* the bitters were antagonistic to the malarial poison, and that strychnia more particularly was especially so. The inference was obvious. I would do a sort of "shot-gun" practice in these cases, and combine the whole of these drugs in appropriate proportions. I have never had cause to condemn

the plain logic which led me to the result. The first thing I knew, I had a reputation for curing cases of malarial poisoning, which the other doctors within a radius of fifty miles had failed to cure. Persons came to me with immense infarctions of the spleen, many of whom, in accordance with what is now known of malarial poisoning, had had no ague at all. I prescribed the pills, and they got well. Persons remained pale, debilitated and sallow from attacks of malarial remittent fever. I prescribed the same pill, and they soon had a good color and a stock of good blood. Others came with neuralgia of longer or shorter standing—of the quotidian, tertian or quartan type, evidently of the malarial stamp, which had been broken up, but which had returned. I broke them up with the usual remedies, and then prescribed the pills of the metals and bitters. Their neuralgia came back no more—for that season at least. Then came anomalous cases—pale, exsanguinous persons—some laboring evidently under the influence of malarial poison—others not, in whom no organic disease could be detected, and for whose maladies the Nosology even of John Mason Good hardly had a name, and who were yet sick. (What doctor of long practice has not seen persons die of a disease for which he could find no name?) There was one thing, however, about all these people—they lacked good blood, and having already come to regard the *Pilulæ Metalorum et Amarum*, from experience as well as upon theoretical grounds, as a most powerful remedy for this condition, I prescribed them. These people almost invariably got well and hearty.—*Pacific Med. and Surg. Journ.*, Oct., 1866.

ON VALERIAN.

By Thomas Doliber.

Query 35. Is the cultivated Valerian produced in New England of equal quality with that imported from England and Germany, and are there any characteristic differences by which they may be distinguished?

The Valerian of American and that of English growth were the only varieties with which experiments were made. The American came from Vermont; the English was obtained from an undoubted source. Solid and fluid extracts of each were made, samples of which and also of the roots are herewith sub-

mitted. A quantity of each fluid extract was given to several physicians and others, but the reports from them were very vague and indefinite. A few years ago a large manufacturer of fluid extracts prepared some fluid extract of each variety, American and English, and several hundred bottles of each were sent to physicians with a request to test their relative merits. The reports were generally in favor of that prepared from the American root.

As no analysis of either variety was made, I cannot state the relative amount of oil yielded by them, nor can I tell the average yield from the American root, but the oil distilled from it is of very fine quality, and is said by those who manufacture it to surpass that obtained from the foreign growth, both in quality and quantity. The amount of oil in the latter varies, according to different authorities, from ·37 to 2 per cent.

The following table shows the yield of alcoholic extract; two trials were made of each variety, and the formula of the Pharmacopœia was strictly adhered to in each case. The results are stated in grains.

Yield of Alcoholic Extract of Valerian.

Variety,	1st trial.	2d trial.	Average.	Av. Per cent.
American,	1690	1648	1669	28·97
English,	964	1064	1014	17·59

Quantity used, 12 troy-ounces, or 5760 grains.

From the above table it will be seen that the average yield of alcoholic extract from two trials was 64 per cent. more from the American than from the English.

Although convinced of the superiority of the American grown Valerian to that of English growth, I cannot adduce sufficient therapeutic evidence to prove the fact.

In regard to the characteristic differences of the two varieties, I cannot give a very definite answer. In the samples which I have seen, the root in the American variety is longer, finer and lighter in color, with the peculiar odor of Valerian much more strongly marked than in the English; the odor of the latter closely resembles that of Canada snakeroot; this peculiar difference in the odor is equally well marked in the solid and fluid extracts herewith submitted. But that the difference in odor

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and appearance, so obvious in the accompanying specimens, is a characteristic one, or only accidental, and depending upon the age of the root, manner of collecting, washing and drying, &c., I cannot state.

The American root is raised in the northern part of Vermont, New Hampshire and New York; it is dug up in the autumn; the adhering dirt is shaken from it and it is carefully washed, generally in running water, and dried quickly in the air and shade and comes into the market very clean and light colored. It is sometimes, however, washed in still water and allowed to remain longer in the water, by which it acquires a somewhat darker color; a sample of each will be seen in the bottle containing the specimen of the American root. In making the solid extract, the first trial was from the dark and the second from the light colored.

The German root is gathered late in the autumn or early in the spring; nearly all that comes to this country is not washed and comes with lumps of dirt enclosed between the fibres. A large proportion of that which is imported as English is actually German root coming through English hands.

Valerian thrives best in a light dry soil, and that which grows in a low wet situation possesses less medicinal properties than the former.

The American variety has almost entirely superseded the foreign in this market, and a large manufacturer of fluid extracts says that he has used them indiscriminately and, of late, the American entirely.

Boston, August, 1866. —*Proc. Am. Pharm. Ass.* 1866.

ON THE SPECIFIC GRAVITY OF MEDICINAL CHLOROFORM.

By John M. Maisch.

While the U. S. Army Laboratory at Philadelphia was in operation, large quantities of chloroform were prepared. It being our aim to furnish all preparations in every respect up to the requirements of the Pharmacopœia, it was aimed to have the specific gravity of the chloroform between 1·490 and 1·494. A

record kept of 44 carboys, with the specific gravity taken by the one-thousand-grain bottle, shows that 18 came fully up to the Pharmacopœia, ranging between 1·4901 and 1·4933. The other 26 were mostly only an insignificant fraction below the former, while several carboys were as low as 1·4841, 1·4844, 1·4846, 1·4860, &c. These variations are easily accounted for, if it is borne in mind that the preparation was made on a very extensive cale,sand that in practice the specific gravity is taken with a hydrometer; then the result will be easily affected by a reduction of the temperature caused by the rapid evaporation of the chloroform, thus making the latter appear heavier than it in reality is.

It was observed that this chloroform decomposed much more rapidly than that of other manufacturers, and it was determined to ascertain the cause of it.

In the first place, pure chloroform, which had been furnished to the medical department of the army, was procured. Of fourteen samples, eleven were below 1·480, the lowest being 1·4760, the highest weighed 1·4806, 1·4815 and 1·4837. On exposing these and some made at the Laboratory to the direct sunlight, the latter was decidedly acid in the course of a day, while the former withstood the action of the light for two or three days, and its decomposition did not proceed quite as fast as in the other case.

A portion of the heavy chloroform was reduced by the addition of a little strong alcohol, when it withstood the decomposing influence of light quite as well as the samples referred to.

Some of these latter were now rectified, in order to obtain them of the standard gravity of the Pharmacopœia. Sulphuric acid was carefully avoided, because it has been asserted by some that it makes chloroform prone to decomposition. By one simple rectification from a water bath, the gravity of chloroform is not much increased. But, if previously washed with water, and rectified over chloride of calcium in a water bath, it may be obtained of the full strength required by the Pharmacopœia. If this chloroform was exposed to the light alongside of that prepared at the place, no difference could be observed in their behaviour, both being decidedly acid after one day's exposure.

It was next thought that probably the impurities contained in

chloroform might cause its rapid decomposition. Some was rectified from a very carefully-regulated water bath, and it was again observed that 98 per cent. may be obtained in this way of such a purity that sulphuric acid will not be affected in the least.

This perfectly clean chloroform generated free chlorine quite as rapidly as before; if diluted with alcohol to below 1·480, it was unaffected by the light.

Mr. Augustus Henkel, now of Cincinnati, and, for a time, one of my valuable assistants at the Laboratory, made a series of experiments on the effects of light, the results of which I subjoin herewith. The chloroform used for the experiments had a specific gravity of 1·492 at 70° F., was absolutely free from acid reaction, and imparted no coloration whatever to sulphuric acid. The diluted chloroform was made of eight ounces of the former, by the addition of one fluidrachm of strong alcohol. The bottles used for the occasion were made of flint glass, of uniform size and shape, and filled alike. The experiments lasted one week during the hot days in August, 1865.

1. *Experiments with pure chloroform.*

Appearance and reaction of chloroform at the end of the week, when kept

	a. In the dark.	*b.* In daylight.	*c.* In direct sunlight.
Bots. glass-stop'd.	Extremely slight reaction.	Decidedly acid.	Free chlorine in yellow drops and suffocating odor.
" corked.	" " "	Slightly acid.	
Cans soldered.	Unchanged.	Unaltered.	Unaltered.
" corked.	Hardly recognizable.	"	"

2. *Experiments with diluted chloroform.*

Appearance and reaction at the end of a week when kept

	a. In the dark.	*b.* In diffused daylight.	*c.* In direct sunlight.
Bottles glass stoppered.	Unchanged.	Unchanged.	Unchanged.
" corked.	"	"	"
Cans soldered.	"	"	"
" corked.	"	"	"

It was concluded from these experiments:—

1. That in order to preserve pure chloroform of specific gravity 1·49, it should be kept totally excluded from the light.

2. That to keep chloroform in the daylight, it should be reduced in specific gravity by the addition of about two fluidrachms of 95 per cent. alcohol to one avoirdupois pound of chloroform, sp. gr. 1·492.

During the repetition of some of these experiments, attention

was drawn to the presence of moisture in some of the bottles, and it was determined to try its effects on chloroform; accordingly, chloroform of 1·492, dried by standing over chloride of calcium, was kept in absolutely dry bottles and in bottles slightly moist, and both kinds exposed to diffused daylight and direct sunlight. The bottle containing the moisture always showed the presence of free chlorine much sooner than the dry one, though the entire absence of moisture would not be sufficient to preserve the chloroform unaltered. But, if the chloroform had been reduced in specific gravity to 1·475 or less, the presence of several drops of water in the bottle would not induce the liberation of chlorine after an exposure of two weeks to the direct sunlight.

No difference in the preservation and decomposition of chloroform could be observed if the bottles were stoppered with glass or cork.

Commercial chloroform was afterwards procured from several manufacturers, and in all cases it was found to have a specific gravity less than 1·480, or barely exceeding it.

I have not found the time yet to prepare absolutely pure chloroform that is absolutely free from water and alcohol, to study the effect of light upon it when preserved in absolutely dry bottles. But even if light should then have no influence on it, it would, for pharmaceutical and medicinal purposes, be of no avail whatever, since the condensation of moisture upon the bottle in damp weather could not be prevented, and would render the chloroform again prone to change.

The practical results of these experiments are the proof that chloroform, to keep it from getting acid, should be reduced in specific gravity to about 1·475. This is effected by adding to one pound of chloroform of sp. gr. 1·492 two fluidrachms of pure 95 per cent. alcohol; the water which collects upon the surface, on standing, can be easily separated. But since, according to my experience, manufacturers always make it of about that specific gravity, the addition of alcohol to the chloroform, as met with in commerce, is unnecessary.

For medicinal purposes, that is, for inhalation, this amount of alcohol would be unobjectionable, since it amounts in one fluidounce only to about forty drops.—*Proc. Am. Pharm. Ass.*

PROCESS FOR THE ESTIMATION OF RESIN IN SOAPS.

By J. Sutherland.

Having often had occasion to analyze samples of soap, the author has found the great want of a process for the correct estimation of the resinous acids contained in admixture with the fatty acids. A process has been given in which spirit of turpentine is recommended for this purpose, but resin being so soluble in that menstruum, it is at once apparent that a correct result cannot be obtained. The following process depends on the fact that resin, when subjected to the action of nitric acid at 212°, is converted into a soluble substance known as terebic acid, ($C_7H_{10}O_4$,) with liberation of nitrous acid; while fatty acids are unacted upon, or at least inappreciably so. Of course, the oleic acid present is converted into elaidic acid; but, as these acids are isomeric, the reaction does not interfere with the accuracy of the result obtained.

Three hundred grains of the soap cut into small pieces are placed in a capsule, and covered with strong hydrochloric acid, the capsule being covered with a piece of glass, and the contents kept gently boiling till the soap is dissolved and thoroughly decomposed. Three or four ounces of hot water are then added, and the capsule is set aside to cool.

When cold, the cake of fatty and resinous acids is carefully removed and re-melted on pure water to remove any acid solution adhering. After cooling, it is dried on bibulous paper, and again very gently re-melted and carefully brought to the boiling point for a minute or two to expel the last traces of moisture.

This cake, containing the fatty and resinous acids, must now be weighed, and the weight carefully noted.

One hundred grains of the mixed acids are placed in a six or eight ounce capsule. It is covered with strong nitric acid, and the temperature gradually raised to the boiling point, when a powerful action takes place with violent evolution of nitrous acid fumes. The heat is withdrawn till the violence of the action subsides, and is then again applied to maintain gentle ebullition for some minutes with frequent stirring.

Small portions of nitric acid are successively added till no

further distinctly appreciable quantity of nitrous acid is given off. The fatty acids are now allowed to cool, and are carefully removed from the strongly-acid and richly-colored solution of terebic acid. The cake is then washed by melting in a further quantity of nitric acid. When cold, it is dried and re-melted at a gentle heat till acid fumes cease to be given off.

The resulting cake is the pure fatty acid freed from resin, the latter being, of course, indicated by the loss. The author has found the above process to give most perfect results by subjecting soaps of known composition to its action.

It will be observed that a correction must be made to obtain the exact relative proportions of fat and resin originally put into the soap-pan, as fats on being decomposed lose about 4½ per cent. of their original weight—*i.e.*, 100 parts tallow-glyceerine = 95½ parts fatty acid. Hence, in making our calculation, a proportionate addition must be made to the fatty acid before dividing its weight by that of the resin indicated. This process is also applicable to the estimation of resin as an adulterant of beeswax.*—*Lond. Chem. News*, Oct. 19, 1866.

Soap Works, Sydney Street, Glasgow.

A VISIT TO A SUSSEX HOP GARDEN.

"Not rural sights alone, but rural sounds,
Exhilarate the spirit, and restore
The tone of languid nature."—*Cowper.*

The month of September is generally a favorite part of the year, as the fatiguing heat of the summer sun is beginning to relax into an agreeable warmth more congenial to our feelings. The operation also of harvesting the corn crops has been performed, and the anxiety of many a paterfamilias, respecting a

* In the *Chem. News*, November 2, a writer criticizes this paper, and believes the author has overlooked the action of NO_5 on the fatty acids as a source of error. In the following number, (Nov. 9,) Mr. Sutherland states that he was well aware of the apparent theoretical fallacies of his process, but that in practice he has found nitric acid to attack the resinous acids by preference, in the presence of the fatty acids. Another writer in the same journal claims to have given the process a fair trial, and doubts its reliability.—Ed. Am. Jour. Pharm.

moderately cheap loaf during the ensuing winter, is satisfactorily and happily allayed. The sportsman takes again his dog and gun, and makes sad havoc among the feathered tribes, to amuse his leisure time, to grace his table, and indulge his appetite. But the month of September is a peculiarly interesting and busy season in some of the rural districts of this country. I allude more particularly to the counties of Kent, Sussex, and Surrey, where the cultivation of the hop plant (*Humulus lupulus*) is carried on to a great extent, and forms one of the most lucrative productions of the agriculturist.

As the catkins of the hop plant is officinal, and recognized in our Pharmacopœias, I think a little information on its growth and treatment may not be uninteresting to those who, perhaps living away from any of the hop districts, are quite unacquainted with its cultivation.

We choose a fine day for our excursion, and accordingly set out, having partaken of a hearty luncheon, and provided ourselves with a pair of old kid gloves to protect our hands from the effects of the hops, which, after long picking, leave a dark brown stain on the skin. We need not walk far from the noiseless business of our country town to reach the object of our wishes, and after walking through a shady lane, and crossing a couple of meadows, we arrive at the scene of action.

The hop plantation, or hop garden, as it is usually called, with its regularly disposed high poles, around which the bines entwine themselves, while the hops hang in graceful clusters therefrom, is a striking and beautiful scene. The pickers are, of necessity, varied in every sense of the word, as in the same garden you may find delegates from the Emerald Isle, bairns from Scotland, and a full complement of English hearts of oak. All ages are represented, from that of the hoary veteran and comely old dame, even down to the innocent infant asleep near its mother, in a box rudely made for the occasion.

In each garden there is a certain number of men called pole-pullers, who, by means of an implement with iron teeth, acting as a lever, lift the heavily laden poles from their earthen sockets, and place them in piles so that the bines may be conveniently stripped by the pickers. The hops, as they are picked,

are dropped into a receptacle or bin formed of canvas, secured to a wooden frame, and not much unlike a child's bedstead, except that the canvas is more loosely nailed to the frame. At stated times a person called a measurer comes to each bin, and removes most of the hops, giving the picker leaden tallies to indicate the number of bushels picked, or entering the number in a small memorandum book kept by the picker. At the end of the picking, each picker delivers up his tallies or book, and is paid according to the number of bushels he has picked. The price paid the pickers differs according to the year, or the quality or quantity of the crop. Some of the pickers come a long distance from home,—a great many from London and its environs; and, at the latter end of August, crowds of rough and dirty looking people may be seen thronging the stations on the South Eastern and North Kent Railways, en route to the hop gardens in the country. On their arrival at the station nearest their destination, they are sometimes met by wagons belonging to the tenants or owners of the respective farms on which they are engaged. When they reach the end of their journey they put up tents, and at night the usually quiet and sombre country scenery is illumined by their large fires, over which they suspend their kettles, and around which they sit and smoke the fragrant weed.

After we have picked a little at several of the bins, we wend our way through the hop garden to the "oast house," or place where the hops are conveyed after the measurer has put them in bags for removal. The oast is a curiously shaped building, and any one utterly unacquainted with its requirements would indeed be surprised at its appearance. The shape somewhat resembles two figures 8 put across each other, as it is built in circles called roundels, which meet and are connected in the centre, each having a spiral roof with an opening at the top, over which is placed a revolving screen called a cowl, which, shifting with the wind, prevents an ingress of the same, and facilitates the egress of the fumes from the fires or flues. Some oasts have only one roundel, while others on large farms have more. These roundels vary from eight to eighteen feet in diameter. On entering, we see in the centre of the building several fires burning, not unlike those

used in ordinary kilns. These fires are kept supplied by charcoal and Welsh coal, thereby causing little or no smoke, and roll sulphur is occasionally added, in order to give the hops the pale yellow and healthy tinge so much sought after by the brewers of fine ales, such as Messrs. Bass and Allsop are noted for.

After ascending a ladder, we find some men emptying the bags of hops we had just left in the garden on to a seemingly wooden floor, which we are informed is made of horse-hair, in order to let the heat from the several fires penetrate evenly and sufficiently through the hops on the top of it. This hair floor is supported by a framework of wood, strong enough to allow the dryer to walk on and turn the hops when necessary; but the sulphurous fumes which pass through them and escape at the top, render that performance very disagreeable. The time the hops require to be subjected to this heat or drying varies from eight to eleven hours, according to their age and ripeness, after which they are taken off and transferred to a cooling room for a short time.

In about two or three hours they are ready for packing, and the process is commenced by stretching the top of one of the pockets, as they are called, on a circular framework in the floor. The hops are now gradually thrown in, and a man gets inside and treads them down as tightly as possible. In some oasts a press is used to compress the hops in the pocket, acting like our tincture presses, the screw being propelled and withdrawn by means of a winch.

After the bag is pressed full, it is taken out of its confinement and sewn up, the weight of it printed on it by means of stensil plates, the grower's name and address having been stamped on the bag previous to filling—the name of the county being particularly plain and truthful, as the price varies with the locality —for example, East Kent hops generally are worth more than West Kent, and Sussex hops less valuable than either, that is to say, for proportionate samples. The samples are drawn from the different pockets and forwarded to merchants in London, who offer them for sale.

After having tired ourselves in the packing room, we thank our rustic informants for their courtesy in explaining, and their

readiness to answer our numerous questions, we take our leave, and are very glad to be again in the pure country air after such a subjection to the sulphurous influence of an oast-house.

We are told the picking lasts from three to six weeks, according to the productiveness of the year. The hop-dryers and pole-pullers are well paid, and the pickers often earn a good round sum, and in fine weather, such as we had in September, 1865, really rather enjoy the change than otherwise; bnt this year the weather during the picking season was very bad, and detracted from their pleasure and added much to their discomfort.

Hop-growing has of late become a popular source of agriculture, and our continental friends are striving in every way to compete with us, and I believe the French intend holding an exhibition of hops and brewing utensils in order to further their knowledge in this respect.

It is a curious thing how times change. Of course we all know a great many English and foreign hops are annually consumed in the process of brewing, and yet (I think I am not in error) in the reign of Henry VIII. a person was arrested on the charge, for that he did wilfully and knowingly use for the purpose of brewing beer a noxious weed, to wit, the hop, which at that early period was a common weed, as we sometimes now see it growing wild in our hedge-rows; but cultivation and attention have brought it to its present beautifully graceful, ornamental, and highly useful state of perfection; and no doubt the majority of our readers enjoy to quaff a draught of that delicious beverage which depends so much upon its prudent admixture. So far as pharmacy is concerned, we have not much to thank the *Humulus lupulus* for, and I know of nothing very remarkable either in the extract or tincture, except that the latter is sometimes very obstinate about becoming clear, even after the infliction of repeated filtrations, and that it is now frequently prescribed in conjunction with carbolic acid as an inhalation in pulmonary affections.

When our curiosity is gratified with regard to the picking, drying, and storing of hops, we start on our homeward walk, and reach the town as the shades of evening draw near, much gratified with our day's amusement. We trust those of our readers

who are ignorant of such scenes as we have described will not be disappointed in reading the history of our visit; while those who live in districts like ourselves can, from similar experience, follow us in every line of our rambles.

A. W. SMITH.

Rye, Sussex, Oct. 25, 1866.

—*London Chemist and Druggist*, Nov. 15, 1866.

ON THE PRESENCE OF PROPIONIC AND BUTYRIC ACIDS AMONG THE PRODUCTS OF THE DESTRUCTIVE DISTILLATION OF WOOD.

BY THOMAS ANDERSON, M. D., F. R. S. E., Professor of Chemistry in the University of Glasgow.

In the manufacture of sodic acetate from crude pyroligneous acid, a mother liquor is obtained, which, even when highly concentrated, refuses to yield a further crop of crystals. On the addition of sulphuric acid, however, it is found still to contain abundance of acetic acid, having a peculiar rancid smell, which led me to suspect the presence of some of its homologues.

In order to ascertain whether this was the case, a considerable quantity of the mother liquor in question was supersaturated with sulphuric acid, and allowed to stand. The crystals of sodic sulphate which deposited having been separated, the fluid was cautiously distilled on a sand-bath, care being taken to stop the process as soon as the slightest trace of sulphurous acid was observed. The distillate was saturated with sodic carbonate, and on evaporation yielded an abundant crop of crystals of sodic acetate. These having been separated, the mother liquor was again concentrated, and this was repeated as long as crystals were obtained. A thick oily fluid was left, to which concentrated sulphuric acid was added in large excess, and the layer which rose to the surface was separated and distilled.

The greater part of it passed over between 117° and 120° C., and obviously consisted of pure acetic acid; but after it had distilled, the thermometer gradually rose, and small fractions were collected until it reached 200°, at which point only a small quantity of fluid remained in the retort.

The fraction distilling between 138° and 143° was converted

into a silver salt, which was found to contain a quantity of silver intermediate between that of the argentic acetate and propionate. The next higher fraction boiling between 143° and 148° was rectified in a small tube retort, and the latter portion of the distillate having been converted into a sodium, salt was fractionally precipitated in three portions with silver nitrate. The last of these was found to contain 59·80 per cent. of silver, and the calculated quantity for argentic propionate is 59·66.

The fraction boiling between 158° and 163° having been treated in a similar manner gave a silver salt which contained 55·10 per cent. of silver, and which was the argentic butyrate, the calculated result for which is 55·30. The acid collected at this temperature had all the characters of butyric acid. It floated on the surface of a small quantity of water, and dissolved in a larger quantity, and its smell was perfectly characteristic.

The acid obtained at a higher temperature had the smell and properties of valerianic acid, but as its quantity was very small, and it was contaminated with a little sulphurous acid, I did not attempt to prepare a silver salt.

I am not aware that these acids have been before observed in crude pyroligneous acid. Their presence in it is not without interest, and is an additional illustration of the frequent occurrence of homologous compounds among the products of destructive distillation.—*Lond. Chem. News, November* 30, 1866.

CRYSTALLIZATION OF RED PHOSPHORUS.

M. Blondlot has succeeded in crystallizing red phosphorus, which has hitherto been considered amorphous, by sublimation in an atmosphere of nitrogen. He introduces about two grammes into a small mattrass, and then closes the neck hermetically by fusion, which can be done without igniting the phosphorus, provided the mattrass be held vertically. Allowing the apparatus to stand, it fills with white vapors, luminous in the dark, which are due to the oxidation of the phosphorus, and in twenty-four hours all the oxygen of the air is absorbed. The phosphorus may then be melted in a water-bath, while the upper part of the mattrass is protected from the heat. The phosphorus is de-

posited in transparent crystals of a cubical form, which, in a few days, form magnificent arborescences, and shine with the lustre and color of the diamond. This state may be preserved by avoiding the light, but by the sunlight, or even by diffused light, they pass to a brilliant garnet-red color, and resemble rubies. A crop of colorless crystals may be got upon the surface of these.—*Journal of the Franklin Institute, December*, 1866.

Varieties.

Insects, fabricators of Iron.—It is well known that some insects are skilful spinners, but it was not known that some of them fabricated iron. A Swedish naturalist, M. de Sjogreen, has published a curious memoir on this subject. The insects in question are almost microscopic; they live beneath certain trees, especially in the province of Smaland, and they spin, like silk-worms, a kind of ferruginous cocoons, which constitute the mineral known under the name of "lake ore," and which is composed of from 20 to 60 per cent. of oxide of iron mixed with oxide of manganese, 10 per cent. of chloric, and some centimetres of phosphoric acid. The deposits of this mineral may be 200 metres long, from 5 to 10 metres wide, and from 8 to 30 inches thick.—*Medical News*, Nov., 1866, from *Rev. de Thérap. Méd.- Chirurg.*, Sept. 15, 1866.

Poisoning by Cyanide of Potassium through carelessness.—Two cases of this are reported in a recent number (June 21, 1866) of the *Boston Med. and Surg. Journal*, which deserve public attention.

In the first, a porter in a machine shop, being thirsty, dipped a tin cup into a jar of liquid, which he supposed to be water, and swallowed about three drachms before he discovered his mistake. In two minutes he became senseless, and was taken to the hospital, and, strange to say, after an emetic, the use of the stomach-pump and of ammonia, he recovered; for the amount of the poison swallowed was estimated at twenty-three grains, and thirty-five minutes elapsed before any of the remedies took effect.

The other case occurred a few days ago under similar circumstances. A thirsty man, a stranger amongst us, went into a jeweller's shop, and asked for a drink of water. He was directed to the rear, where the sink was situated. Seeing a large covered stone jar standing near it, such as is often used for holding ice-water, he lifted the cover and drank, without stopping to look at it, about half an ounce of the liquid. He became insensible in five minutes. It was found impossible to administer an emetic

of sulphate of zinc in the apothecary's shop, whither he was at once taken, or later to use the stomach pump at the hospital. He died in thirty minutes after drinking what he supposed to be a harmless draught of water. The liquid was a solution of cyanide of potassium in water, of the same strength as that swallowed in the first case—a pound to the gallon. The quantity taken was therefore about half a drachm of one of the most deadly poisons known, of which two or three grains are sufficient to kill a large animal, and five grains have destroyed human life in several instances. The prolongation of life in this, and the wonderful escape from death in the former case, were undoubtedly in great part owing to the fact that the stomach was filled with food, and that on this account the poison was not so rapidly converted into hydrocyanic acid and absorbed.

The editor justly remarks:

"We are far too lax in our police regulations respecting the use and sale of poisons, and if the same energy which is exercised in the enforcement of the liquor and Sunday laws were turned in this direction, much good would result."—*Med. News*, July, 1866.

Liquor of Villate.—M. Houel presented to the Imperial Academy of Medicine (May 2, 1866) a pamphlet on this preparation by Dr. Not a, of Lisieux, which drew from the members some interesting remarks, a summary of which may interest our readers.

The liquor of Villate is an astringent and escharotic preparation which, according to the Veterinary Pharmacopœia, is composed as follows:

Liquid Subacetate of Lead, . .	30 parts,
Crystallized Sulphate of Copper, . .	
Crystallized Sulphate of Zinc, *aa*, . .	15 "
White Vinegar, ...	200 "

Dr. N. has employed this preparation with success for many years in the treatment of caries, and of fistulæ following cold abscesses. The memoir of Dr. Notta contains numerous striking cases drawn from his own practice and that of M. Nelaton, showing the efficacy of this preparation. There is much difference of opinion, however, among the members of the Society of Surgery of Paris in regard to this article. MM. Houel, Léon, Labbé, and Desormeaux assert that they have obtained the best results from its use, and have never seen any injury or even serious inconvenience result from it.

On the contrary, MM. Legouest, Chassaignac, Boinet, Le Fort, and Laborie, state that it occasions excessive, insupportable pain, irritation, and very serious inflammation. Finally, MM. Follin and Verneuil have used it sometimes with good, sometimes bad effects; both have found injections of the fluid induce acute pain; the first has never seen any injury result, the second has witnessed severe inflammation, which, however, resulted in a cure.—*Med. News*, July, 1866, from *Revue de Thérapeutique Méd.-Chirurg.*, June 1, 1866.

Manufacture of Iodine.—To the Editor of the Chemical News. Sir: I have been a subscriber to the Chemical News for many years. In No. 364 I read an inquiry for the names of manfacturers of iodine. Perhaps it may serve the purpose of your correspondent to know that in this city, where more than nine-tenths of all the iodine produced in Great Britain is manufactured, there are only four works—

	Annual Produce.
One producing about . .	20 kegs of 112 lbs. each
One " " . .	100 " "
One " " . .	150 " "
One (my own manufactory) .	1000 " "
In all,	1270 " "

Should this information be what your correspondent wants, he is welcome to use it. Yours, &c., Wm. Patterson.

Glasgow, Nov. 26.

—*Chem. News, Nov.* 30, 1866.

A process has been discovered by which india rubber can be bleached to a pure white, and after having been hardened will be used for collars and cuffs. It is a difficult one, which has long been sought for, and is done by a chemical process, which is said to be fatal to the workmen engaged therein unless protection is afforded them.—*Journal of Applied Chemistry*, Nov., 1866.

India Rubber Varnish.—That India rubber dissolved in various liquids yields a good varnish is well known; but in general they are too viscid for delicate purposes, and are only good for making stuffs water-proof. India rubber liquefied by heat, dissolved in oil or coal tar, or drying linseed oil, does not give a varnish of sufficient fluency or free from smell. Moreover, a considerable quantity of India rubber remains undissolved in a gelatinous state, suspended in the liquid, so that the solution is never clear. Dr. Bolly has recently published some remarks on the subject which may be useful. If India rubber be cut into small pieces and digested in sulphuret of carbon, a jelly will be formed; this must be treated with benzine, and thus a much greater proportion of caoutchouc will be dissolved than would be done by any other method. The liquid must be strained through a woolen cloth, and the sulphuret of carbon be drawn off by evaporation in a water bath; after which the remaining liquid may be diluted at will with benzine, and frequently shaking the bottle which contains it. The jelly thus formed will partly dissolve, yielding a liquid which is thicker than benzine, and may be obtained very clear by filtration and rest. The residue may be separated by straining, and will furnish an excellent water-proof composition. As for the liquid itself, it incorporates easily with all fixed or volatile oils. It dries very fast, and does not shine

unless mixed with resinous varnishes. It is extremely flexible, may be spread in very thin layers, and remains unaltered under the influence of air and light. It may be employed to varnish geographical maps or prints, because it does not reflect light disagreeably as resinous varnishes do, and is not subject to crack or come off in scales. It may be used to fix black chalk or pencil drawings; and unsized paper, when covered with this varnish, may be written on with ink.—*Journ. Applied Chem.*, Nov., 1866.

Bicarbonate of Ammonia.—Schrotter found a mass of crystals in a cast-iron pipe through which raw gas passed, which on analysis proved to have the composition $NH^4O,^2CO^2+HO$. Before the analysis was made the crystals were cleaned from coal-tar with which they were soiled, and were resublimed. There is no doubt, then, of the existence of a true carbonate of ammonia.—*Journ. Applied Chem.*, Nov., 1866, from *Silzungsrb. d. Akad. d. Wissenschaf. zu Wien*, Bd. xliv. s. 33.

Cement to fasten Iron in Stone.—A German Professor has found out a cement for fastening iron in stone, which in 48 hours becomes nearly as hard as the stone itself. This consists of six parts of Portland cement, one part nicely powdered lime, burnt but not slacked, two parts of sand, and one part of slacked lime. This, when well mixed and reduced to one mass of cement with the necessary quantity of water, is put in the crevices or openings of the stone and the iron, both being previously damped, and after 48 hours the iron will be found thoroughly and lastingly fastened in the stone.—*Journ. Applied Chem.*, Nov., 1866.

Editorial Department.

Our Journal.—With this number commences the thirty-ninth volume,—the fifteenth of the Third Series. The period which has elapsed since January, 1861, has been an eventful series of years in journalism, marked with many changes, the indirect result of the political convulsions which have shaken our country in all its internal relations. Very many journals succumbed to the storm, discontinued their issues, and have not yet revived. The inflation of prices of raw material and labor, due to a paper currency, and the immense taxation necessary to meet the interest on the public debt, have influenced every branch of business, and among them that of publishing books. As the cost of a book is influenced by the number sold, so the cost of a journal varies with the number of its subscribers. As no change in the price of this journal has been made, our readers may easily see that the College has not found it a profitable speculation

to continue it through all the difficulties we have hinted at, nor has the editorial supervision of it been free from embarrassments. During the war, men's minds were too much absorbed in the great issues of that epoch to give thought or time to scientific or professional research, and since, every one's energy seems given to push business to meet the demands created by taxation in its varied forms. Numerous contributors have long been silent, and here at home, among our own members, the same inactivity exists. A valued correspondent in Ohio says of some who are disposed to find fault: "they think the Journal is getting more scientific than practical; what they mostly desire is articles more strictly relating to *pharmacy*, and good *practical working formulæ* for preparing newly introduced remedies. Many acknowledge the value of highly scientific articles, but say they would rather read them in works relating to the subject," &c., &c.

In reply to so much of this criticism as relates to the scientific tendency of this Journal, we will call attention to the advertisement always printed on the cover in reference to its objects: "*This Journal is devoted to the advancement of pharmaceutical knowledge, including practical pharmacy, materia medica, chemistry in its general and applied relations, and to the collateral sciences, botany, mineralogy, zoology, &c.*" In reference to the articles on practical pharmacy and recipes queried after, not a few have been published, but, let us ask, what is the source of such articles? Are they not eliminated by the brains and hands of pharmaceutists who work out the processes for themselves, and who are liberal enough to communicate the knowledge thus gained for the benefit of those who are not able to do it for themselves, or who won't make the exertion? Now, here's the rub. The apothecaries who work out these problems *are, in general, not thus liberally disposed;* on the contrary they make specialities of their recipes on all occasions where there is a prospect of pecuniary return. There are some bright exceptions, however; and to these mainly must the progress of our art be attributed; and here lies the difference between the contributors to journals devoted to abstract, and to applied science. The former are generally men anxious for distinction, or those already distinguished in research, or earnest seekers of knowledge for its own sake; they are not looking to see how much money is in every discovery. The latter are contributed to by practical men of all grades. One writes to direct attention to a *patented* process; another describes a substance, the *origin* of which is involved in doubt; a third gives a recipe, with the manipulation omitted, as an advertisement; whilst a fourth—a *rara avis*—tells the whole story, and gives the true working formula or process. Now it is to the labors of this latter class that our correspondent alludes, and we earnestly second his wishes so far as to appeal to that respectably large class of pharmaceutists, dotted here and there over our wide country, who really, at heart, have a warm feeling for the progress of our art, but who fancy it don't need their aid and efforts. To these gentlemen we say,

glance over your laboratory note books, and see if there are no suggestions that will interest your brethren without injuring your business, no matter how meagre or unscientific they may appear. Further, if you know of any officinal formula that is defective, send a note of your view of the deficiency and in what respect you think it can be improved, and, if possible, how. Others, seeing this, will be stimulated to give their experience, and thus the truth will be advocated, and good seed sown. There must be some to work for the general good in every cause. Let us join hands, then, in contributing more practical articles to our Journal, at the same time that it retains its standing as a record of pharmaceutical science. Let us reach down to the aid of those who can only appreciate pharmaceutical literature in the shape of money-saving formulas and processes, and give them a sustaining draught,—mayhap, in time, they may gain strength and interest enough to digest articles of a higher grade, become pharmaceutists in reality, as well as in name, and return the gift with interest in the form of papers to this or some other Journal.

Percentages on Prescriptions.—It has long been the received impression that pharmacy, though a derivative or off-shoot from medicine, is now an independent profession, business or calling; that when the pharmaceutist carefully and correctly composes and dispenses the physician's prescription he has done his whole duty to the physician and his patient, and in return receives from the latter the regular and proper price for the medicine, which should fully compensate him for the cost of the drugs and the investment of time and skill employed in their preparation and dispensing. In the matter of patronage, the pharmaceutist is its recipient sometimes from the physician, sometimes from the patient, frequently from both. The writer of a prescription is clearly entitled to the assurance that it will be correctly dispensed, as it is the best means that he can devise to cure the disease. The patient also has a direct interest in the character of the dispenser who serves him, and where a preference exists a reasonable physician will not object, unless he has had occasion to doubt the ability or integrity of the dispenser, or unless, for legitimate special reasons, a particular apothecary can serve him best. We have known physicians to refuse to attend a case unless the prescription was sent to a specially named dispenser. We have also known the heads of families who would not employ a physician who refused to have his prescriptions dispensed by the family apothecary. In point of fact, however, the physician generally controls the case, and it is of the utmost consequence to his reputation, therefore, that his motives should be beyond reproach.

These reflections have been suggested by the following printed circular, which was received by a physician:

"*Confidential.*

"Dr. ———. *Dear Sir:*—Having recently located myself at ———

Street as practical druggist and pharmaceutist, I would most respectfully solicit your patronage. With an experience of ten years at the head of the prescription department, I trust by the strictest CARE AND DILIGENCE to merit your favor.

"Feeling a desire to make my establishment a permanency, and owing to the great competition I may have to contend with, I beg leave to offer you a commission of ten per cent. on your prescriptions, payable monthly. Sincerely hoping that this proposition may not meet with your disfavor,

"I am, very respectfully,

"Your obedient servant,

"*Philada., Nov.*, 1866."

This is not the first time we have seen a missive of this character, though it but rarely happens that the apothecary has so mistaken the general temper of physicians as to approach them in this palpable form. In another instance 25 per cent. was offered as the inducement to the physician to part with his self-respect. On the contrary, the proposition sometimes comes from the other direction, and it is the apothecary who is applied to by the physician. In either case it is a direct temptation to the sin of covetousness,—urging the physician to prescribe more frequently and expensively than he otherwise might think necessary, and urging the apothecary to overcharge the patient, that he may retain his usual profits.

However this may be, it is all wrong, and an insult either way to honorable members of either profession, and should be discountenanced by them both. Let the writer of the above missive take the beaten path to success in pharmacy by meriting success on the score of excellence in dispensing, both as regards the quality of his drugs, the perfection of his preparations, and the neatness of his dispensing; and with a reasonable amount of patience and enterprise, he will much sooner succeed than by perilling his reputation by such offers.

DUPLICATING NUMBERS.—It has become necessary to advertise our subscribers that the mail service is at their risk, and that it is impossible for us to make up all the losses that are occasioned by irregularities of the Post Office. The last volume for 1866 is nearly out of print, as a complete volume, from this cause,—remailing numbers not received—and we wish it distinctly understood that after carefully addressing and mailing this Journal to a party, our responsibility ends, and if there is loss it must be borne by the subscriber. This will lead to more care in giving addresses, and cause subscribers to look to the Post Office for redress. Where we are really in fault we expect to be responsible.

Manual of Materia Medica and Therapeutics. Being an abridgement of the late Dr. Pereira's Elements of Materia Medica, arranged in conformity with the British Pharmacopœia, and adapted to the use of medical practi-

tioners, chemists and druggists, medical and pharmaceutical students, &c. By Frederick John Farre, M.D., Cantab., F.L.S., &c., &c., &c., assisted by Robert Bentley, Professor of Materia Medica to the Pharmaceutical Society, &c., and by Robert Warrington, F.R.S., of Apothecaries' Hall, &c. Edited, with numerous references to the U. S. Pharmacopœia, and many other additions, by Horatio C. Wood, Jr., M.D., Professor of Botany in the University of Pennsylvania, &c. With 236 wood engravings. Philada., Henry C. Lea, 1866: pp. 1030.

If it was necessary to have another work on materia medica in England, it would have been well for Dr. Farre and his co-laborers to have built one up from the foundation, as they are abundantly able to do, and let the great work of Pereira remain unabridged, retaining undimmed, amid all future revisions, the impress of his genius and research.

The author of the abridgement, Dr. Farre, has reduced the work to about one-third its size, not only by condensing the leading articles, but by extensive omissions from the first volume of the original, and by omitting all pharmacological remedies not contained in the officinal list of the British Pharmacopœia. Now it is well known that the list of the British Pharmacopœia was very much reduced in the late revision, thus affording to Dr. Farre, so far as his British readers were concerned, a legitimate ground for extensive curtailment. But however this may suit the medical practitioners of England, we very much doubt the wisdom of excluding so many articles that were more or less used or referred to in some portions of that kingdom, and especially by druggists and pharmaceutists who have to cater for medical men of all grades of opinion in materia medica. It is better to have the mere name of an article, with reference to where ti may be found noticed, than to pass it by untouched.

The American publishers having determined to reprint the book, and seeing these deficiencies, very wisely placed the work in the hands of an editor,—Dr. Horatio C. Wood, Jr.,—to restore these omissions, and, by the introduction of the processes of the United States Pharmacopœia, to adapt it, as far as possible, to the wants of physicians and pharmaceutists here. How well this onerous task has been performed, and how much the book has been increased in value to American readers by Dr. Wood's labors, let us examine. Besides the numerous interpolations of formula from the U. S. Pharmacopœia, "over one hundred articles on substances in the U. S. Ph. have been introduced," many of which are of prime importance. In hastily glancing over the volume we have noticed among these, glacial phosphoric acid, iodide of sulphur, ammoniæ valerianas, potassii cyanidum, sulphite of soda, liquor magnesiæ citratis, aluminæ sulphas, acid. chromic, kermes mineral, cadmii sulphas, plumbi iodidum, ferri subcarbonas, pil. ferri carbonatis, liq. ferri subsulphatis, liq. ferri tersulphatis, ferri lactas, ferri ferrocyanidum, etc., among mineral substances; and oatmeal, sago sabadilla, veratrum viride, aloe capensis, allium, vanilla, cypripedium, arum, symplocarpus, maranta, tapioca, stillingia, American ipecac, asarum

canadense, wormseed phytolacca, sassafras bark and pith, hedeoma, salvia, monarda, leptandra, gelsemium, sulphate of atropia, gutta percha, chimaphila, gaultheria, eupatorium lactucarium, coffee, madder, spigelia, ginseng, wild cherry bark, quince seed, rubus villosus, gillenia, calabar bean, simaruba, rhus toxicodendron, cotton root, ol. theobromæ, sanguinaria, cornus florida, helleborus niger, coptis, cimicifuga, hydrastis, and many others. The interpolation of so much matter (nearly one-fourth of the volume) has made the editorial office no sinecure, and the general accuracy and faithfulness of the service deserves commendation. We say *general*, because there are some points in which the editor has not brought the work quite up to the present level; for instance, in the chemistry of veratrum viride, ergot, and black pepper. The researches of C. Bullock and W. T. Wenzell are not noted in the two first, and in the notice of piperin its alkalinity is questioned. The editor has also introduced a large number of the illustrations of the large edition of Pereira, together with several new cuts, among which that on veratrum viride is excellent. The publisher has done his part well, both as regards paper, press-work and binding, making a handsome volume of over a thousand pages.

Practical Therapeutics, considered chiefly with reference to articles of the Materia Medica. By Edward John Waring, F.R.C.S., F.L.S., Surgeon in Her Majesty's Indian Army. From the second London edition. Philada., Lindsay & Blakiston, 1866: pp. 815 octavo.

This work by Dr. Waring, to the most casual reader, presents the subject in a form that attracts attention from the simplicity of its arrangement, and the perspicuity of its style. Unlike the larger works of Wood, Stillé and others in general use, the arrangement is based on the items of materia medica in alphabetical order. The range of drugs noticed is very extensive, but, whilst the author has adopted a materia medica framework, he has carefully avoided making his book a treatise on drugs, by giving only the most salient points of their history and characters. Thus, of camphor the author says: "Camphora, Camphor. A concrete volatile oil obtained by sublimation from the wood of Camphora officinarum (Laurus camphora, *Linn.*), a native of China and Japan. *Nat. Ord.*, Lauraceæ; *Linn. Syst.*, Enneandria monogynia. It is also found in white crystalline fragments in the wood of Dryabalanops camphora. It is found in small quantities in other plants; that used in the Tennaserim Provinces is obtained in considerable quantities and of fair quality from the leaves and stalks of the Blumea grandis (*De Cand*). Comp. $C_{20}H_{16}O_2$. Equiv. wt. 152."

This brief notice is followed by six pages, the first of which refers to the medical properties, mode of action, officinal preparations and modes of administration of camphor, whilst the other five are occupied with its therapeutic uses. In giving these, the paragraphs are headed in italics with the more prominent diseases in which the drug is used, making refer-

ence easy and convenient. In order to meet the difficulty which is presented by this arrangement to those who are accustomed to a nosological arrangement, an INDEX OF DISEASES has been introduced, in which reference is made to the name and page of all substances used in each disease.

It will be found that the author has judiciously gone more into details in the important articles, such as quinia, chloroform, opium, rhubarb, ol. terebinthina, etc. He has given copious references to the authors from whom he quotes, but in many instances it is to be regretted the articles indicate an imperfect acquaintance with American medical authorities,—a fact not surprising, as his first edition was written in the East Indies. For this reason, the valuable properties of many useful American drugs are wholly unnoticed, among which may be mentioned wild cherry bark, ulmus, cornus florida, gillenia, geranium, gossypii radix, monarda, stillingia, hydrastis, cypripedium, gelsemium, symplocarpus, etc. It will be also observed that Æther is noticed with half a page of comment, whilst chloroform occupies twelve pages! thus showing how the stand-point and circumstances that surround a writer influence his writings. Dr. Waring, aiming, as he evidently does, to embrace a wide range of non-officinal remedies, would do well to consult more American authors before he issues another edition.

The second part of the book refers to medicinal agencies and therapeutic classes, as alteratives, anæsthetics, hot and cold baths, blood-letting, electricity, inhalation, etc.

The book is beautifully gotten up by the publishers, and is certainly one of the most valuable additions to a medical library that has been published of late years.

Synopsis of the various courses of practical instruction pursued in the School of Analytical and Applied Chemistry in the University of Michigan. By Silas H. Douglass, M.A., M.D., Prof. of Chemistry. Ann Arbor, 1866.

This department of the extensive educational operations of the University of Michigan is under the direction of Prof. Silas H. Douglass and his assistants, and embraces courses on *qualitative analysis, determinative mineralogy, quantitative analysis, metallurgy and assaying, toxicology, urinalysis and practical pharmacy.*

"The first of these courses is required of all students entering the laboratory; and to be admitted to it the student must pass a satisfactory examination in elementary chemistry." Hence the object of this course is to familiarize the student practically with the subject he has been merely studying in books, and requires him to examine qualitatively one hundred compounds. The other courses can be chosen from as to which will be pursued afterwards. In the quantitative course fifty separate operations are carried out, including the analysis of salts, minerals, alloys, ashes, soils and mineral waters. Alkalimetry, acidimetry, chlorimetry,

alcoholometry and organic analysis are included. The courses on toxicology and urinalysis are specially directed to medical students and physicians, and are very thorough. The course on practical pharmacy, which appears to be a new feature, embraces five parts: 1, weighing and measuring, including specific gravity; 2, the determination of alkalies and acids; 3, distillation; 4, preparations, including chemicals inorganic and organic, solutions, tinctures, wines, extracts, syrups, pills, troches, etc., etc., following the U. S. Pharmacopœia,—giving especial attention to the methods of percolation, evaporation in vacuo, etc.; 5, extemporaneous pharmacy, including the compounding of prescriptions, spreading plasters, emulsionizing, etc., finishes the course. As this course is necessarily based on the preliminary one on qualitative analysis, the pharmaceutical student, being familiar with chemical changes, is prepared to detect incompatibles and adulterations.

The University authorities have erected a building specially for the accommodation of this School, with complete modern appliances for heating, ventilation and for investigations. The term begins October 1st, and continues nine months.

So far as can be judged by the programme, and from the knowledge we have of Prof. Douglass as a teacher, we believe this Schoool calculated to be very useful to those who attend it. The liberal basis on which the University of Michigan is conducted gives all the tuitional advantages of the University courses, including those of this School, for thirty dollars; but the student must pay for the chemical apparatus actually consumed in analysis, etc., at the ordinary retail prices. It is such a School as this that the Alumni of the Philadelphia College of Pharmacy propose to endow in that Institution, and to be conducted parallel with the thorough theoretical courses which have long been given under its auspices.

Catalogue of the Class of the Philadelphia College of Pharmacy,

FOR THE FORTY-SIXTH SESSION, 1866–67.

With a List of their Preceptors and Localities.

MATRICULANTS.	TOWN OR COUNTY.	STATE.	PRECEPTOR.
Abernethy, Robert H.	Philadelphia.	Pennsylvania,	H. H. Abernethy.
Allaire, Charles B.	Aurora,	Illinois,	Edward Parrish.
Archibald, Henry C.	Philadelphia,	Pennsylvania,	H. C. Archibald.
Austin, J. H.	Chambersburg,	"	Charles Shivers.
Ayres, F. L.	La Salle,	Illinois,	F. G. Crane.
Bartram, Ernest,	Philadelphia,	Pennsylvania,	S. T. Jones.
Bates, Louis A.	Wetumpka,	Alabama,	George W. Harris.
Beck, Jacob B.	York,	Pennsylvania,	H. B. Lippincott.
Beck, John W.	Lancaster,	Ohio,	G. G. Beck.
Blizzard, Joseph E.	Philadelphia,	Pennsylvania,	John Stradley, M.D.
Bollinger, A. D.	Schafferstown,	"	
Borhek, James T., Jr.	Bethlehem,	"	M. M. Selfridge.
Boring, Edwin McC.	Lancaster,	"	E. B. Garrigues.
Bourke, Joseph M.	Philadelphia,	"	

Boyd, Abraham,	Licking County,	Ohio,	C. R. Keeney.
Boyle, James O.	Philadelphia,	Pennsylvania,	Mecray & Dickson.
Boyle, John,	"	"	C. Ellis, Son & Co.
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Bradley, Thomas F.			Hazzard & Smith.
Bronson, Eugene C.	Chicago,	"	Bennet L. Smedley.
Brown, Samuel A.	Philadelphia,	Pennsylvania,	J. R. Anguey, M.D.
Brown, Thomas J.	Rockdale,	"	James T. Shinn.
Bucher, H. F.	Carlisle,	"	
Buckman, James,	Bristol,	"	D. L. Stackhouse.
Burrows, George,	Philadelphia,	"	Hance, Griffith & Co.
	"	"	John Gegan, M.D.
Carberry, P. J. L.			
Chance, Henry C.	Llewellyn,	"	Samuel Gerhard.
Chandler, D. Woelpper,		Delaware,	Elliot, White & Co.
Clark, A. B., Jr.	Galesburg,	Illinois,	J. T. McKnight.
Corbidge, J. E.	Chicago,	"	S. Mason McCollin.
Craven, James,	Philadelphia,	Pennsylvania,	Bullock & Crenshaw.
Croft, Samuel F.	Chambersburg,	"	Frederick Brown.
Cumming, C. L.	Philadelphia,	"	C. L. Cumming.
Cuthbert, Richard W.	Athensville,	"	O. S. Hubbell.
Davis, Aaron R.		New Jersey,	Amos Hansell.
Davis, Henry,	Crosswicks,	"	
Dilks, Samuel L.	Philadelphia,	Pennsylvania,	S. L. Dilks.
Drescher, Augustus,	New York,	New York,	
Eayre, Mortimer H.		New Jersey,	D. Milligan.
Elliott, Frederick G.	Philadelphia,	Pennsylvania,	Wetherill & Bro.
England, Howard,	Wilmington,	Delaware,	L. M. England.
Erwin, Bertine S.	Bethlehem,	Pennsylvania,	C. Ellis, Son & Co.
Esterle, August A.	Philadelphia,	"	Royal & Royer.
Estlack, Horace W.	"	"	A. H. Yarnall.
Farr, William L.	Oxford,	Ohio,	McGaw & Ridey.
Ferguson, William M.,			W. H. Gillard.
Foulke, James,	Quakertown,	Pennsylvania,	A. Tatem.
Frazer, R. S.	Johnstown,	"	C. T. Frazer.
Fromheiser, James J.		"	E. Herwig.
Früh, Carl,		Germany,	C. H. Needles.
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Haig, Charles R.	Philadelphia,	"	H. A. Bower.
Hambright, Edwin A.	Mount Holly,	New Jersey,	Wm. Procter, Jr.
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Harding, Henry,	"	"	C. H. Fish.
Harner, James M.	Reading,	"	A. B. Taylor.
Harris, Edwin M.	Philadelphia,	"	George W. Harris.
Harrop, Joseph,	Galliopolis,	Ohio,	
Harry, Albert,		Maryland,	Hassard & Co.
Harry, Jacob,		"	Hassard & Co.
Hays, Nathan W. C.	Burlington,	New Jersey,	Daniel S. Jones.
Hecker, Jacob K.	Lebanon,	Pennsylvania,	Wm. B. Webb.
Henszey, W. C.	Philadelphia,	"	Carpenter, Hensney & Co.
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Hoagland, P. R.	Chicago,	Illinois,	Wm. Macpherson.
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Horn, David,	Philadelphia,	Pennsylvania,	John Horn.
Isard, George W.	"	"	W. Gibson, M.D.
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Jorden, Henry A.		"	Wm. H. Hickman.
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Kay, Samuel D.	Haddonfield,	New Jersey,	
Kille, Caldwell,	Philadelphia,	Pennsylvania,	Bullock & Crenshaw.
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Klump, Charles C.	Allentown,	"	Gustavus Radefeld.
Koch, Christian,	Philadelphia,	"	
Koldewey, Robert,	"	"	Wm. H. Webb, M.D.
Kolp, C. Henry,	"	"	Wm. Ellis & Co.
Lessey, Oliver H.	"	"	Bullock & Crenshaw.
Lillard, Benjamin,	Nashville,	Tennessee,	Powers & Weightman.
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Locuson, Joseph S.	"	"	Isaac H. Kay.
Loran, Thomas,	Dublin,	Ireland,	
Loughlin, Dennis J.	Philadelphia,	Pennsylvania,	D. Jameson, Jr.

McInall, Edward, Jr.	Wilmington,	Delaware,	Edward McInall.
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McMinn, Joseph H.	Williamsport,	"	J. T. Shinn.
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Marshall, R. T.,	Philadelphia,	Pennsylvania,	W. F. Simes.
Mathews, C. C.	Shippensburg,	"	C. B. Elbe.
Mattern, William K.,	Philadelphia,	"	S. Rosenberger, M.D.
Merkel, Louis J.,	Watertown,	Wisconsin,	Ambrose Smith,
Merklein, Charles H.	Chambersburg,	Pennsylvania,	N. C. Reid, M.D.
Missinger, Levin A.	Easton,	"	C. H. Needles.
Moore, Charles C.	Philadelphia,	"	Bullock & Crenshaw.
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Moseley, A.	"	"	Wyeth & Bro.
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Parrish, Clemmons,	"	"	E. Parrish.
Plunk, Winfield S.	Churchtown,	"	H. F. Bucher.
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Roche, William F.	"	"	E. M. Roche.
Rosengarten, F. H.	"	"	Rosengarten & Sons.
Schaffle, S. W. W.	"	"	Elliot, White & Co.
Schell, Harry D.	"	"	Jenks & Middleton.
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Seybert, Robert L.	Philadelphia,	Pennsylvania,	Thomas Gorden, M.D.
Shaw, Joseph B.	Cape Island,	New Jersey,	Wm. R. Claridge, M.D.
Shivers, Charles, Jr.	Philadelphia,	Pennsylvania,	Bullock & Crenshaw.
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Stackhouse, George P.	Philadelphia,	Pennsylvania,	F. Zerman, M.D.
Stokes, J. Spencer, M.D.	"	"	
Storks, L. Scott,	Media,	"	G. C. Evans.
Swaim, George M.	Newark,	New Jersey,	
Tait, Stewart,	Philadelphia,	Pennsylvania,	
Taylor, James,	Philadelphia,	Pennsylvania,	James L. Bispham.
Treichler, L. A.		"	Charles L. Eberle.
Vandegrift, Isaac P.	Haddonfield,	New Jersey,	Thomas Estlack.
Walling, W. H.	Philadelphia,	Pennsylvania,	W. H. Walling.
Walton, Samuel D.	"	"	J. M. Maris.
Warrington, Edward C.	"	"	Bullock & Crenshaw.
Webb, Samuel W.	"	"	Elliot, White & Co.
Webb, William H.	"	"	U. S. Laboratory.
Weichselbaum, Jacob,	"	"	Smith & Shoemaker.
Weidemann, Charles A.	"	"	Theophilus Fischer, M.D.
Westermann, Joseph F.	"	"	Wm. C. Todd, M D.
Wetherill, S. P.	"	"	Wetherill & Bro.
Weymer, H. B.	"	"	C. Ellis, Son & Co.
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Wilson, Charles,	York,	"	Curran & Wilson.
Wilson, Edwin K.,	Haddonfield,	New Jersey,	T. R. Coombe.
Wilson, William,	Parkesburg,	Pennsylvania,	James H. Smith.
Wirgman, Charles,	Philadelphia,	"	Edwin Thomas.
Witmer, Horace F.	"	"	Carpenter, Henszey & Co.
Wood, John Y.		"	James W. Harry.
Wooding, Albert E.	Dixon,	Illinois,	E. Parrish.
Woodward, Charles E.	Marshallton,	Pennsylvania,	C. Ellis, Son & Co.